

**NASA TECHNICAL
MEMORANDUM**



NASA TM X-1233

NASA TM X-1233

UTILITY FORM 902

N66-235 57
(ACCESSION NUMBER)

158
(PAGE)

TAX-1235
(NATIONAL TAX OR A.D. NUMBER)

1
(COPY)

13
(CATEGORY)

GPO PRICE \$ _____

CFSTI PRICE(S) \$ 1.95

Hard copy (HC) _____

Microfiche (MF) 1.00

ff 653 July 65

**COMPUTED TIMES
OF SUNRISE AND SUNSET
IN THE IONOSPHERE**

*by Lawrence Colin and Marilyn A. Myers
Ames Research Center
Moffett Field, Calif.*

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION • WASHINGTON, D. C. • APRIL 1966

COMPUTED TIMES OF SUNRISE AND SUNSET IN THE IONOSPHERE

By Lawrence Colin and Marilyn A. Myers

Ames Research Center
Moffett Field, Calif.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

For sale by the Clearinghouse for Federal Scientific and Technical Information
Springfield, Virginia 22151 - Price \$1.95

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY	1
INTRODUCTION	1
DETERMINATION OF SUNRISE AND SUNSET TIMES	2
TABLE OF SUNRISE AND SUNSET TIMES	3
GRAPHS OF SUNRISE AND SUNSET TIMES	4
EXTENSION OF THE DATA	4
APPENDIX - PROGRAM FOR COMPUTING SUNRISE-SUNSET TIMES	6
TABLES	8
FIGURES	97

COMPUTED TIMES OF SUNRISE AND SUNSET IN THE IONOSPHERE

By Lawrence Colin and Marilyn A. Myers
Ames Research Center

SUMMARY

23557

Tables and graphs of sunrise and sunset times at the earth's surface and several altitudes (100, 200, 300, 400, 1000 km) in the ionosphere are presented. The tabulated data list these times for the first and fifteenth of each month for the period October 1, 1962, through July 15, 1964. The computations were performed in 2° latitude increments over the range $\pm 88^\circ$. Both Cartesian and polar coordinate graphs of sunrise and sunset times versus latitude are presented. Altitudes of 0, 100, and 300 km are shown on the Cartesian coordinate plots for each of the above dates. The north and south polar projection representations illustrate sunset and sunrise "lines" for all the computed altitudes but only for the first of each month.

All necessary equations for the computations are derived in the text and a Fortran IV source program provided in an appendix. It is shown how the reader may extend the computations to other dates and/or altitudes.

INTRODUCTION

To that phase of ionosphere physics research which deals with daytime-nighttime transitions, the importance of considering sunrise and sunset effects at nonzero ionospheric altitudes has been well known for some time (ref. 1). Recent high-frequency oblique propagation studies via the bottomside ionosphere have again emphasized this importance (ref. 2). Although the computation of sunrise and sunset times for a certain date, latitude, and altitude is quite straightforward, it is difficult to visualize, a priori, the variations of these times in view of the broad variation of these latter parameters. Unfortunately, the published literature referring to these effects illustrate only isolated, limited situations peculiar to the particular research reported.

With the advent of the polar-orbiting topside sounder Alouette I in 1962, enormous quantities of thermal electron concentration data have become available enabling detailed pole-to-pole morphology studies of the topside ionosphere, from the F-region peak to the orbiter altitude. Furthermore, the extended series of ISIS sounders will allow a complete solar-cycle survey of this morphology. Thus, sunset-sunrise time data may well have more significant applications to these extensive topside studies than to the isolated bottomside studies.

It is the purpose of this memorandum simply to present more detailed data than heretofore published on sunrise and sunset times versus altitude and latitude during the IQSY period. Although the results presented clearly illustrate most, if not all, of the general features of this natural phenomenon, they

by no means exhaust all particular situations. For the reader who requires more, a simple Fortran IV source program, suitable for the IBM 709⁴, for calculating sunrise and sunset times, is presented in an appendix.

DETERMINATION OF SUNRISE AND SUNSET TIMES

The geometry for the rising or setting of visible solar radiation, from the sun's upper limb, at a point P situated on a sphere of radius $(a + H)$ concentric with a spherical earth of radius (a) is shown in figure 1(a). Although for normal astronomical observations this picture would suffice (with proper allowance for atmospheric refraction), it must be modified for ionospheric studies. Here we are interested in the solar wavelengths that effect ion production, and are heavily absorbed in the lower atmosphere. Hence, figure 1(b) is more appropriate. This geometry allows for a "screening" height, S , which permits the radiation to pass over the major absorbing regions. An exact choice of a numerical value for S is difficult to justify. In all our results to be presented we have assumed $S = 30$ km (when $H > 0$) in consonance with others (refs. 1 and 2), although the computer program (appendix) allows all $S \leq H$. Furthermore, because of this arbitrariness, we have considered it reasonable to neglect the effect of refraction in the computations.

It is easily shown from figure 1(b) that

$$\cos \chi = - \sqrt{1 - \left(\frac{a + S}{a + H} \right)^2} \quad (1)$$

where χ = solar zenith angle at sunrise and sunset ($\chi \geq 90^\circ$ all H). It should be noted that since the earth-sun distance is much greater than any ionospheric height of concern here, the earth-centered angle QOP' , where Q is the sub-solar point and P' the point of projection of P onto the earth's surface, is also approximately equal to χ ; that is, the two horizontal lines in figure 1(b) are approximately parallel. With this approximation, the geometry of sunrise and sunset on a certain date may be depicted as in figure 2. Here N is the north pole; δ , the solar declination on that date (assumed to be the value at Greenwich noon on that date); L , the latitude of the observer (P); and LHA , the local hour angle of the sun at sunrise or sunset (defined as the angular distance from the meridian of P' to the meridian of Q). When the law of cosines is applied to the spherical triangle NQP' :

$$\cos \chi = \cos(90 - \delta)\cos(90 - L) + \sin(90 - \delta)\sin(90 - L)\cos LHA \quad (2)$$

or

$$\cos \chi = \sin \delta \sin L + \cos \delta \cos L \cos LHA \quad (3)$$

Finally, it is clear that

$$\text{sunrise time (hr)} = 12^{\text{hr}} - E^{\text{hr}} - \frac{LHA(\text{deg})}{15} \quad (4)$$

$$\text{sunset time (hr)} = 12^{\text{hr}} - E^{\text{hr}} + \frac{\text{LHA}(\text{deg})}{15} \quad (5)$$

where the correction factor:

E^{hr} = equation of time in hours (defined as the difference in time between the apparent (true) and mean sun = app - mean)

Equations (4) and (5) illustrate the fact that sunrise and sunset times are not symmetrical about local noon but are symmetrical about $(12^{\text{hr}} - E^{\text{hr}})$. The slight asymmetry introduced by a nonconstant δ throughout the day is negligible.

We now have all the necessary equations. Given an ionospheric height, H , and an assumed screening height, S , the zenith angle at sunrise and sunset is computed from equation (1). With this zenith angle χ , and a chosen observing latitude L , we can calculate the local hour angle of sunrise and sunset, LHA, from equation (3) for any date (the latter defining both the solar declination and equation of time E). Local sunrise and sunset times for that date, L , H , and S , are then finally calculated from equations (4) and (5).

A few words on conventions are in order. North declinations and latitudes are positive; south declinations and latitudes are negative. Local hour angle of the sun is measured positive westward from the observing meridian. For certain combinations of variables equation (2) may yield $|\cos \text{LHA}| > 1$. In such cases sunrise and sunset do not occur and the point in question is either in total darkness or total sunlight throughout the day, a choice of which is easily determined by consideration of the season concerned. It should be noted that the definition of E used here is the negative of that normally used by others (refs. 1 and 2) but is identical to that listed in recent ephemerides. (After 1965 the ephemerides redefine E as the correction to be applied to $12^{\text{hr}} + \text{local mean time (LMT)}$ to obtain the LHA of sun (ref. 3, 1965)).

TABLE OF SUNRISE AND SUNSET TIMES

Unfortunately the required solar ephemeris data need to be garnered from separate yearly publications:

- E: American Ephemeris and Nautical Almanac (ref. 4)
- δ : Nautical Almanac (ref. 5)

Reference 5 also gives E but the accuracy of the tabulation is insufficient for our purposes. Reference 4 gives δ at midnight, but not at noon.

The appendix gives a Fortran IV computer program for computing sunrise and sunset times. We have used this program to compute these times at five ionospheric heights (100, 200, 300, 400, 1000 km), for the first and fifteenth of each month extending over the period October 1, 1962 to July 15, 1964. In all cases $S = 30$ km. Table I shows the computer print-out. The date,

declination of the sun at noon in degrees, and equation of time in hours both on that date are given on the top of each sheet. Columns 3 through 7 give the sunrise and sunset times (in hours, minutes, and seconds) at each of the above ionospheric heights. These times are given over the pole-to-pole latitude (LAT) range $|\text{LAT}| \leq 88^\circ$ in 2° latitude steps as listed in column 1. For reference purposes computed ground ($H = 0$) sunrise and sunset times are given in column 2. Here S has been assumed zero, but for compatibility with ephemeris listings (refs. 4 and 5) of ground sunrise and sunset times we have assumed $\chi = 90^\circ 50'$ (allowing $34'$ for atmospheric refraction and $16'$ for the solar subtended half-angle). It may indeed be verified that the computed times agree with the tabulations contained in references 4 and 5.

GRAPHS OF SUNRISE AND SUNSET TIMES

Cartesian coordinate graphs of local sunrise and sunset times for three altitudes ($H = 0, 300, 1000$ km) and for each of the dates given in table I are shown in figures 3 to 46. North and south polar coordinate representations of these data for altitudes $H = 0, 100, 200, 300, 400, 1000$ km, but only for the first of each month during calendar year 1963 are shown in figures 47 to 58. These latter graphs may be easily interpreted by noting that the sun lies always at the top of each graph such that the noon meridian is the vertical line extending from the north or south pole toward the sun. Hence, each sunrise-sunset "line" marks the geographical extent of total sunlight (above the "line") and total darkness (below the "line") for the particular date corresponding to that "line." Note that the portion of each "line" to the right of the noon-midnight meridian specifies a rise time for each latitude, whereas the portion to the left specifies the set time for each latitude. It is quite interesting that periods of total darkness (or total sunlight) at the ground occur at times of total sunlight (or total darkness) at ionospheric altitudes in certain polar cap regions.

EXTENSION OF THE DATA

The computer program used to calculate the data presented above is given in the appendix. For researchers not having access to a computer, or requiring only limited additional computations, hand calculations using the equations presented above are, of course, easily performed.

To extend the computations to other altitudes one needs only employ an appropriate $\cos \chi$ in equation (3). Figure 59 illustrates the manner in which χ varies with H for a fixed $S = 30$ km. For precise extension of the computations to other days of the months already presented, the appropriate E 's and δ 's available in references 4 and 5 must be used. For many purposes, however, interpolation of the tabulations and graphs given may suffice. Extending the computations to other years again requires appropriate E 's and δ 's. The required data, for the first and fifteenth of each month for calendar years 1960 through 1964, are given in table II. Solar declination at noon is given in

degrees, minutes, and seconds of arc, and the equation of time, in minutes and seconds of time. One purpose of presenting sunrise and sunset times for the better part of two years in table I and figures 3 to 46 is to enable the determination of the annual change of these times on a given date. It is clear from the results that this variation is negligible for most purposes. Also, comparing the variation of δ and E over a five-year period in table II shows that the graphs presented are quite representative for any year, at least in the period discussed.

Ames Research Center
National Aeronautics and Space Administration
Moffett Field, Calif., Jan. 7, 1966

APPENDIX

PROGRAM FOR COMPUTING SUNRISE-SUNSET TIMES

```

INTEGER YR,DY,TR1,TR2,TR3,TS1,TS2,TS3
REAL L HAR,LHAD
DIMENSION TR1(89,6),TR2(89,6),TR3(89,6),HE(6),XPH(89),PR(2)
DIMENSION TS1(89,6),TS2(89,6),TS3(89,6)
DATA (PR(I),I=1,2)/1H ,1H1/, (HE(I),I=1,6)/0.,100.,200.,300.,400.,1
1000./
WRITE (6,1)
1  FORMAT(40H1COMPUTATION OF SUNRISE AND SUNSET TIMES)
2  READ (5,3) YR,MO,DY,DELTD,E
3  FORMAT (3I3,2F8.2)
DO 9 I=1,6
IF (I-1) 5,4,5
4  TERM=-.01454
S=0.
H=0.
GO TO 6
5  H=HF(I)
S=30.
TERM=-SQRT(1.-((6370.+S)/(6370.+H))**2)
6  PHID=-90.
DO 9 J=1,89
PHID=PHID+2.
XPH(J)=PHID
PHIR=PHID*.017453
DELTR=DELTD*.017453
LHAR=(TERM-SIN(PHIR)*SIN(DELTR))/COS(PHIR)/COS(DELTR)
IF (ABS(LHAR)-1.) 8,8,7
7  TR1(J,I)=0
TR2(J,I)=0
TR3(J,I)=0
TS1(J,I)=24
TS2(J,I)=0
TS3(J,I)=0
GO TO 9
8  LHAR=ACOS(LHAR)
LHAD=LHAR*57.2958
TR=AMOD(12.-F-LHAD/15.+24.,24.)
TS=AMOD(12.-E+LHAD/15.+24.,24.)
TR1(J,I)=TR
Z1=TR1(J,I)
Z1=(TR-Z1)*60.
TR2(J,I)=Z1
Z2=TR2(J,I)
TR3(J,I)=(Z1-Z2)*60.
TS1(J,I)=TS
Z1=TS1(J,I)
Z1=(TS-Z1)*60.
TS2(J,I)=Z1
Z2=TS2(J,I)
TS3(J,I)=(Z1-Z2)*60.
9  CONTINUE
WRITE (6,10) YR,MO,DY,DELTD,E
10  FORMAT(5H1DATE,1X,3I3,5X,26HDECLINATION OF SUN AT NOON,F7.2,5X,16H
1EQUATION OF TIME,F6.2)
APR=PR(1)
WRITE (6,11) APR
11  FORMAT(A1,14X,11HHEIGHT = 0.,10X,4H100.,17X,4H200.,17X,4H300.,17X,
14H400.,17X,5H1000./8X,18HSCREEN HEIGHT = 0.,11X,3H30.,18X,3H30.,18
2X,3H30.,18X,3H30.,19X,3H30./2X,3HLAT,6(4X,7HSUNRISE,3X,6HSUNSET,1X
3))
DO 12 I=1,44
12  WRITE (6,13) XPH(I),(TR1(I,J),TR2(I,J),TR3(I,J),TS1(I,J),TS2(I,J),
1TS3(I,J),J=1,6)
13  FORMAT(1X,F4.0,6(2X,3I3,1X,3I3))
APR=PR(2)
WRITE (6,11) APR
DO 14 I=45,89
14  WRITE (6,13) XPH(I),(TR1(I,J),TR2(I,J),TR3(I,J),TS1(I,J),TS2(I,J),
1TS3(I,J),J=1,6)
GO TO 2
END

```

REFERENCES

1. Mitra, S. K.: The Upper Atmosphere. Second ed. (The Asiatic Monograph Series, vol. V), The Asiatic Society, Calcutta, India, 1952.
2. Brady, A. H.; and D. D. Crombie: Calculation of Sunrise and Sunset Times at Ionospheric Heights Along a Great Circle Path. NBS TN-209, U. S. National Bureau of Standards, Nov. 8, 1964.
3. Allen, William H., ed.: Dictionary of Technical Terms for Aerospace Use. NASA SP-7, 1965.
4. U. S. Nautical Almanac Office: The American Ephemeris and Nautical Almanac. U. S. Govt. Print. Off., Washington, D. C., 1965.
5. U. S. Nautical Almanac Office: The Nautical Almanac. U. S. Govt. Print. Off., Washington, D. C., 1965

TABLE I. - SUNRISE AND SUNSET TIMES

DATE	DECLINATION OF SUN AT NCCA		EQUATION OF TIME		C.17		400.		1000.	
	100.	200.	300.	400.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	24	24	24	24	0	0	0	0	0	0
-86.	24	24	24	24	0	0	0	0	0	0
-84.	24	24	24	24	0	0	0	0	0	0
-82.	24	24	24	24	0	0	0	0	0	0
-80.	24	24	24	24	0	0	0	0	0	0
-78.	24	24	24	24	0	0	0	0	0	0
-76.	24	24	24	24	0	0	0	0	0	0
-74.	24	24	24	24	0	0	0	0	0	0
-72.	24	24	24	24	0	0	0	0	0	0
-70.	24	24	24	24	0	0	0	0	0	0
-68.	24	24	24	24	0	0	0	0	0	0
-66.	24	24	24	24	0	0	0	0	0	0
-64.	24	24	24	24	0	0	0	0	0	0
-62.	24	24	24	24	0	0	0	0	0	0
-60.	24	24	24	24	0	0	0	0	0	0
-58.	24	24	24	24	0	0	0	0	0	0
-56.	24	24	24	24	0	0	0	0	0	0
-54.	24	24	24	24	0	0	0	0	0	0
-52.	24	24	24	24	0	0	0	0	0	0
-50.	24	24	24	24	0	0	0	0	0	0
-48.	24	24	24	24	0	0	0	0	0	0
-46.	24	24	24	24	0	0	0	0	0	0
-44.	24	24	24	24	0	0	0	0	0	0
-42.	24	24	24	24	0	0	0	0	0	0
-40.	24	24	24	24	0	0	0	0	0	0
-38.	24	24	24	24	0	0	0	0	0	0
-36.	24	24	24	24	0	0	0	0	0	0
-34.	24	24	24	24	0	0	0	0	0	0
-32.	24	24	24	24	0	0	0	0	0	0
-30.	24	24	24	24	0	0	0	0	0	0
-28.	24	24	24	24	0	0	0	0	0	0
-26.	24	24	24	24	0	0	0	0	0	0
-24.	24	24	24	24	0	0	0	0	0	0
-22.	24	24	24	24	0	0	0	0	0	0
-20.	24	24	24	24	0	0	0	0	0	0
-18.	24	24	24	24	0	0	0	0	0	0
-16.	24	24	24	24	0	0	0	0	0	0
-14.	24	24	24	24	0	0	0	0	0	0
-12.	24	24	24	24	0	0	0	0	0	0
-10.	24	24	24	24	0	0	0	0	0	0
-8.	24	24	24	24	0	0	0	0	0	0
-6.	24	24	24	24	0	0	0	0	0	0
-4.	24	24	24	24	0	0	0	0	0	0
-2.	24	24	24	24	0	0	0	0	0	0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5 46 27	17 53 8	5 16 C	18 23 35	4 57 28	18 42 7	4 44 16	18 55 19	4 33 33	19 6 2	3 50 41	19 48 54
2.	5 46 53	17 52 42	5 16 25	18 23 10	4 57 53	18 41 42	4 44 40	18 54 55	4 33 58	19 5 37	3 51 6	19 48 29
4.	5 47 19	17 52 16	5 16 48	18 22 47	4 58 14	18 41 21	4 45 C	18 54 35	4 34 17	19 5 18	3 51 22	19 48 13
6.	5 47 45	17 51 50	5 17 8	18 22 27	4 58 31	18 41 4	4 45 15	18 54 20	4 34 30	19 5 5	3 51 28	19 48 7
8.	5 48 10	17 51 25	5 17 26	18 22 5	4 58 44	18 40 51	4 45 25	18 54 10	4 34 38	19 4 57	3 51 25	19 48 10
10.	5 48 36	17 50 59	5 17 42	18 21 53	4 58 54	18 40 41	4 45 30	18 54 5	4 34 39	19 4 56	3 51 11	19 48 24
12.	5 49 2	17 50 33	5 17 55	18 21 40	4 58 59	18 40 36	4 45 31	19 54 4	4 34 35	19 5 C	3 50 48	19 48 47
14.	5 49 27	17 50 8	5 18 6	18 21 25	4 59 1	18 40 34	4 45 26	18 54 9	4 34 25	19 5 10	3 50 15	19 49 20
16.	5 49 53	17 49 42	5 18 14	18 21 21	4 58 55	18 40 36	4 45 16	18 54 19	4 34 6	19 5 27	3 49 31	19 50 4
18.	5 50 20	17 49 15	5 18 20	18 21 15	4 58 53	18 40 42	4 45 1	18 54 34	4 33 46	19 5 49	3 48 36	19 50 59
20.	5 50 46	17 48 49	5 18 24	18 21 11	4 58 42	18 40 53	4 44 40	18 54 55	4 33 16	19 6 19	3 47 29	19 52 6
22.	5 51 13	17 48 22	5 18 25	18 21 10	4 58 27	18 41 8	4 44 13	18 55 22	4 32 39	19 6 56	3 46 9	19 53 26
24.	5 51 41	17 47 54	5 18 23	18 21 12	4 58 7	18 41 28	4 43 40	18 55 55	4 31 55	19 7 40	3 44 37	19 54 58
26.	5 52 9	17 47 26	5 18 18	18 21 17	4 57 42	18 42 23	4 42 14	18 57 21	4 30 3	19 8 31	3 42 50	19 56 45
28.	5 52 36	17 46 57	5 18 11	18 21 24	4 57 12	18 42 23	4 42 14	18 57 21	4 30 3	19 9 32	3 40 48	19 58 47
30.	5 53 8	17 46 27	5 18 C	18 21 35	4 56 36	18 42 59	4 41 19	18 58 16	4 28 54	19 10 41	3 38 29	20 1 6
32.	5 53 36	17 45 57	5 17 46	18 21 49	4 55 55	18 43 40	4 40 17	18 59 18	4 27 34	19 12 1	3 35 52	20 3 43
34.	5 54 10	17 45 25	5 17 28	18 22 7	4 55 6	18 44 29	4 39 6	19 0 29	4 26 4	19 13 31	3 32 55	20 6 40
36.	5 54 43	17 44 52	5 17 6	18 22 29	4 54 10	18 45 25	4 37 45	19 1 50	4 24 22	19 15 13	3 29 34	20 10 1
38.	5 55 17	17 44 18	5 16 41	18 22 54	4 53 7	18 46 28	4 36 14	19 3 21	4 22 27	19 17 8	3 25 48	20 13 47
40.	5 55 53	17 43 42	5 16 10	18 23 25	4 51 55	18 47 40	4 34 31	19 5 4	4 20 17	19 19 18	3 21 32	20 18 3
42.	5 56 31	17 43 4	5 15 34	18 24 1	4 50 33	18 49 2	4 32 34	19 7 1	4 17 51	19 21 44	3 16 43	20 22 52
44.	5 57 11	17 42 24	5 14 52	18 24 43	4 49 C	18 50 35	4 30 22	19 9 13	4 15 7	19 24 28	3 11 15	20 28 20
46.	5 57 53	17 41 42	5 14 4	18 25 31	4 47 14	18 52 21	4 27 54	19 11 41	4 12 1	19 27 34	3 5 C	20 34 35
48.	5 58 36	17 40 57	5 13 9	18 26 26	4 45 15	18 54 20	4 25 6	19 14 29	4 8 31	19 31 4	2 57 51	20 41 44
50.	5 59 27	17 40 8	5 12 5	18 27 30	4 42 59	18 56 36	4 21 56	19 17 39	4 4 33	19 35 2	2 49 33	20 50 2
52.	6 C 19	17 39 16	5 10 51	18 28 44	4 40 25	18 59 10	4 18 20	19 21 15	4 0 1	19 39 34	2 39 51	20 59 44
54.	6 1 15	17 38 20	5 9 26	18 30 9	4 37 25	19 2 6	4 14 13	19 25 22	3 54 51	19 44 44	2 28 20	21 11 15
56.	6 2 17	17 37 18	5 7 48	18 31 47	4 34 7	19 5 28	4 9 29	19 30 6	3 48 53	19 50 42	2 14 22	21 25 13
58.	6 3 42	17 36 9	5 5 55	18 33 40	4 30 15	19 13 51	3 57 19	19 35 34	3 41 58	19 57 37	1 56 52	21 42 43
60.	6 4 26	17 35 53	5 3 42	18 35 53	4 25 44	19 19 7	3 50 10	19 40 25	3 33 51	20 5 44	1 33 38	22 5 57
62.	6 6 7	17 35 28	5 1 8	18 36 27	4 20 28	19 19 7	3 41 14	19 49 25	3 24 13	20 15 22	0 58 20	22 41 15
64.	6 7 44	17 34 51	4 58 5	18 41 30	4 14 15	19 25 20	3 41 14	19 58 21	3 12 34	20 27 1	0 0 0	24 0 0
66.	6 9 25	17 34 C	4 54 26	18 45 9	4 6 48	19 32 47	3 30 24	20 9 11	2 58 10	20 41 25	0 0 0	24 0 0
68.	6 11 44	17 33 18	4 50 3	18 49 32	3 57 44	19 41 51	3 16 59	20 22 36	2 39 49	20 59 46	0 0 0	24 0 0
70.	6 14 17	17 32 18	4 44 41	18 54 54	3 46 28	19 53 7	2 59 52	20 39 43	2 15 11	21 24 24	0 0 0	24 0 0
72.	6 17 23	17 31 12	4 37 59	19 1 36	3 32 7	20 7 28	2 36 59	21 2 36	1 38 34	22 1 1	0 0 0	24 0 0
74.	6 21 12	17 30 23	4 29 26	19 10 9	3 13 6	20 26 29	2 3 51	21 35 44	0 12 23	23 27 12	0 0 0	24 0 0
76.	6 26 5	17 30 30	4 18 8	19 21 27	2 46 21	20 53 14	1 4 6	22 35 29	0 0 0	24 0 0	0 0 0	24 0 0
78.	6 32 34	17 29 7	4 2 34	19 31 1	2 4 11	21 35 24	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	6 41 38	16 57 57	3 39 38	19 59 57	0 0 0	23 27 20	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	6 55 17	16 44 18	3 1 51	20 37 44	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	7 18 31	16 31 4	1 39 6	22 31 20	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	8 8 15	15 31 20	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	14 24 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	52	10	15	HEIGHT = C.	DECLINATION OF SUN AT NOON	-8.44	EQUATION OF TIME	0.23	300.	30.	400.	30.	1000.	
	SCREEN	SUNRISE	SUNSET	HEIGHT = C.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	C	C	C	24	C	C	C	C	C	C	C	C	C	C
-86.	C	C	C	24	C	C	C	C	C	C	C	C	C	C
-84.	C	C	C	24	C	C	C	C	C	C	C	C	C	C
-82.	C	C	C	24	C	C	C	C	C	C	C	C	C	C
-80.	C	C	C	24	C	C	C	C	C	C	C	C	C	C
-78.	1	14	54	22	17	29	C	C	C	C	C	C	C	C
-76.	2	25	15	21	20	30	C	C	C	C	C	C	C	C
-74.	3	26	59	23	5	24	C	C	C	C	C	C	C	C
-72.	3	45	5	19	47	18	C	C	C	C	C	C	C	C
-70.	3	59	4	19	22	19	C	C	C	C	C	C	C	C
-68.	4	10	16	19	22	7	C	C	C	C	C	C	C	C
-66.	4	19	29	19	12	54	C	C	C	C	C	C	C	C
-64.	4	27	14	19	5	9	C	C	C	C	C	C	C	C
-62.	4	32	52	18	38	31	C	C	C	C	C	C	C	C
-60.	4	35	37	18	52	46	C	C	C	C	C	C	C	C
-58.	4	44	41	18	47	42	C	C	C	C	C	C	C	C
-56.	4	45	10	18	43	13	C	C	C	C	C	C	C	C
-54.	4	53	11	18	35	12	C	C	C	C	C	C	C	C
-52.	4	56	49	18	35	34	C	C	C	C	C	C	C	C
-50.	5	5	C	18	32	16	C	C	C	C	C	C	C	C
-48.	5	3	55	18	25	15	C	C	C	C	C	C	C	C
-46.	5	5	55	18	26	28	C	C	C	C	C	C	C	C
-44.	5	8	30	18	22	53	C	C	C	C	C	C	C	C
-42.	5	10	54	18	21	29	C	C	C	C	C	C	C	C
-40.	5	13	9	18	19	14	C	C	C	C	C	C	C	C
-38.	5	15	15	18	17	8	C	C	C	C	C	C	C	C
-36.	5	17	15	18	15	8	C	C	C	C	C	C	C	C
-34.	5	19	58	18	13	15	C	C	C	C	C	C	C	C
-32.	5	20	55	18	11	28	C	C	C	C	C	C	C	C
-30.	5	22	38	18	9	45	C	C	C	C	C	C	C	C
-28.	5	24	16	18	6	7	C	C	C	C	C	C	C	C
-26.	5	25	50	18	6	33	C	C	C	C	C	C	C	C
-24.	5	27	21	18	5	2	C	C	C	C	C	C	C	C
-22.	5	28	48	18	3	35	C	C	C	C	C	C	C	C
-20.	5	30	13	18	2	10	C	C	C	C	C	C	C	C
-18.	5	31	35	18	C	48	C	C	C	C	C	C	C	C
-16.	5	32	56	17	38	9	C	C	C	C	C	C	C	C
-14.	5	34	14	17	36	52	C	C	C	C	C	C	C	C
-12.	5	35	31	17	36	37	C	C	C	C	C	C	C	C
-10.	5	36	46	17	34	22	C	C	C	C	C	C	C	C
-8.	5	38	1	17	34	9	C	C	C	C	C	C	C	C
-6.	5	39	14	17	31	57	C	C	C	C	C	C	C	C
-4.	5	40	26	17	31	57	C	C	C	C	C	C	C	C
-2.	5	41	38	17	31	57	C	C	C	C	C	C	C	C

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.	1000.		400.		300.		200.		100.	
			SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 42 49	17 45 34	5 12 5	18 20 18	4 53 22	18 39 1	4 40 1	18 52 22	4 40 1	18 52 22	4 29 12	19 3 11
2.	5 44 C	17 48 23	5 13 15	18 19 8	4 54 33	18 37 50	4 41 13	18 51 10	4 42 20	18 50 3	4 30 25	19 1 58
4.	5 45 12	17 47 11	5 14 24	18 17 59	4 55 40	18 36 43	4 42 20	18 50 3	4 43 22	18 49 1	4 31 31	19 0 52
6.	5 46 23	17 46 C	5 15 30	18 16 53	4 56 44	18 35 39	4 43 22	18 49 1	4 44 20	18 48 3	4 32 32	18 59 51
8.	5 47 34	17 44 45	5 16 34	18 15 49	4 57 44	18 34 39	4 45 13	18 47 10	4 45 13	18 47 10	4 33 28	18 58 55
10.	5 48 46	17 42 24	5 17 36	18 14 47	4 58 41	18 33 42	4 46 1	18 46 22	4 46 1	18 46 22	4 34 18	18 58 5
12.	5 49 59	17 41 11	5 18 35	18 13 47	4 59 34	18 32 49	4 46 45	18 45 38	4 46 45	18 45 38	4 35 3	18 57 20
14.	5 51 12	17 41 11	5 19 35	18 12 48	5 C 24	18 31 59	4 47 25	18 44 58	4 47 25	18 44 58	4 36 16	18 56 41
16.	5 52 26	17 35 57	5 20 32	18 11 51	5 1 11	18 31 12	4 48 C	18 44 23	4 48 C	18 44 23	4 36 45	18 55 7
18.	5 53 42	17 38 41	5 21 27	18 10 56	5 1 54	18 30 29	4 48 31	18 43 52	4 48 31	18 43 52	4 37 8	18 55 15
20.	5 54 59	17 37 24	5 22 21	18 10 C	5 2 35	18 29 48	4 49 19	18 43 4	4 49 19	18 43 4	4 37 25	18 54 58
22.	5 56 18	17 36 5	5 23 14	18 9 9	5 3 46	18 28 37	4 49 36	18 42 47	4 49 36	18 42 47	4 37 37	18 54 46
24.	5 57 39	17 34 44	5 24 5	18 8 18	5 4 17	18 28 6	4 49 55	18 42 35	4 49 55	18 42 35	4 37 42	18 54 41
26.	5 59 2	17 32 21	5 25 45	18 6 38	5 4 44	18 27 39	4 49 56	18 42 27	4 49 56	18 42 27	4 37 42	18 54 41
28.	6 C 28	17 31 55	5 26 33	18 5 50	5 5 29	18 26 54	4 49 51	18 42 32	4 49 51	18 42 32	4 37 42	18 54 41
30.	6 1 57	17 30 26	5 27 20	18 5 3	5 6 10	18 26 38	4 49 40	18 42 43	4 49 40	18 42 43	4 36 57	18 55 26
32.	6 3 29	17 28 54	5 28 7	18 4 16	5 6 10	18 26 38	4 49 22	18 43 1	4 49 22	18 43 1	4 35 47	18 55 56
34.	6 5 46	17 27 18	5 29 37	18 2 46	5 6 10	18 26 17	4 48 57	18 43 26	4 48 57	18 43 26	4 35 47	18 55 36
36.	6 8 31	17 23 52	5 30 21	18 2 2	5 6 10	18 26 13	4 48 57	18 43 59	4 48 57	18 43 59	4 34 58	18 57 25
38.	6 10 22	17 22 1	5 31 4	18 1 19	5 6 2	18 26 14	4 47 41	18 44 42	4 47 41	18 44 42	4 33 58	18 58 25
40.	6 12 20	17 20 3	5 32 28	17 59 55	5 6 2	18 26 21	4 46 48	18 45 35	4 46 48	18 45 35	4 32 46	18 59 37
42.	6 14 25	17 17 58	5 33 9	17 59 14	5 6 2	18 26 34	4 45 44	18 46 39	4 45 44	18 46 39	4 31 20	19 1 3
44.	6 16 39	17 15 44	5 34 30	17 58 33	5 6 2	18 27 21	4 44 27	18 47 56	4 44 27	18 47 56	4 29 38	19 2 45
46.	6 19 2	17 13 21	5 35 10	17 57 53	5 6 2	18 27 57	4 42 56	18 49 27	4 42 56	18 49 27	4 27 40	19 4 43
48.	6 21 37	17 10 46	5 35 49	17 56 34	5 6 2	18 28 43	4 41 7	18 51 16	4 41 7	18 51 16	4 25 21	19 7 2
50.	6 24 25	17 7 58	5 36 28	17 55 55	5 6 2	18 30 52	4 38 57	18 55 59	4 38 57	18 55 59	4 22 38	19 9 45
52.	6 27 29	17 4 54	5 37 7	17 55 16	5 6 2	18 32 20	4 36 24	18 55 59	4 36 24	18 55 59	4 19 27	19 12 56
54.	6 30 32	17 1 31	5 37 45	17 54 38	5 6 2	18 34 7	4 33 22	18 59 1	4 33 22	18 59 1	4 15 43	19 16 40
56.	6 33 49	16 53 34	5 38 23	17 53 23	4 56 4	18 36 19	4 29 45	19 2 38	4 29 45	19 2 38	4 11 19	19 21 4
58.	6 36 49	16 50 46	5 39 C	17 52 46	4 53 22	18 39 1	4 25 24	19 6 59	4 25 24	19 6 59	4 6 5	19 26 18
60.	6 39 1	16 47 49	5 39 37	17 52 3	4 50 1	18 42 22	4 20 8	19 12 15	4 20 8	19 12 15	3 59 48	19 32 35
62.	6 42 49	16 44 49	5 40 15	17 52 8	4 45 45	18 46 34	4 13 41	19 18 42	4 13 41	19 18 42	3 52 11	19 40 12
64.	6 45 1	16 42 22	5 40 51	17 51 32	4 40 30	18 51 53	3 55 26	19 36 57	3 55 26	19 36 57	3 42 49	19 49 34
66.	6 48 49	16 39 36	5 41 28	17 50 55	4 33 36	18 58 47	3 42 5	19 50 18	3 42 5	19 50 18	3 31 3	20 1 20
68.	6 52 20	16 36 36	5 42 5	17 50 18	4 24 25	19 7 58	3 23 54	20 8 29	3 23 54	20 8 29	3 15 50	20 16 33
70.	6 55 47	16 33 35	5 43 19	17 49 41	4 11 40	19 20 43	2 57 31	20 34 52	2 57 31	20 34 52	2 55 43	20 37 4
72.	6 58 49	16 30 29	5 43 56	17 48 27	3 52 57	19 39 26	2 18 45	21 17 58	2 18 45	21 17 58	2 55 43	20 37 4
74.	7 1 47	16 27 33	5 44 34	17 47 49	3 52 57	19 39 26	2 18 45	21 17 58	2 18 45	21 17 58	2 55 43	20 37 4
76.	7 4 47	16 24 33	5 45 14	17 47 9	3 52 57	19 39 26	2 18 45	21 17 58	2 18 45	21 17 58	2 55 43	20 37 4
78.	7 7 47	16 21 33	5 46 4	17 46 19	3 52 57	19 39 26	2 18 45	21 17 58	2 18 45	21 17 58	2 55 43	20 37 4
80.	7 10 47	16 18 33	5 47 14	17 45 9	3 52 57	19 39 26	2 18 45	21 17 58	2 18 45	21 17 58	2 55 43	20 37 4
82.	7 13 47	16 15 33	5 48 4	17 44 4	3 52 57	19 39 26	2 18 45	21 17 58	2 18 45	21 17 58	2 55 43	20 37 4
84.	7 16 47	16 12 33	5 49 14	17 43 9	3 52 57	19 39 26	2 18 45	21 17 58	2 18 45	21 17 58	2 55 43	20 37 4
86.	7 19 47	16 9 33	5 50 4	17 42 19	3 52 57	19 39 26	2 18 45	21 17 58	2 18 45	21 17 58	2 55 43	20 37 4
88.	7 22 47	16 6 33	5 51 14	17 41 4	3 52 57	19 39 26	2 18 45	21 17 58	2 18 45	21 17 58	2 55 43	20 37 4

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

[illegible]

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = 0.		1000.		400.		300.		200.		100.		30.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5 40 21	17 47 14	5 8 57	18 18 38	4 45 45	18 37 46	4 36 11	18 51 24	4 45 45	18 37 46	4 36 11	18 51 24	4 25 7	19 2 28	3 40 38	19 46 57
2.	5 42 24	17 45 11	5 11 C	18 16 35	4 51 54	18 35 41	4 38 17	18 49 18	4 51 54	18 35 41	4 38 17	18 49 18	4 27 14	19 0 21	3 42 55	19 44 40
4.	5 44 27	17 43 8	5 13 C	18 14 34	4 53 54	18 33 41	4 40 18	18 47 17	4 53 54	18 33 41	4 40 18	18 47 17	4 29 16	18 58 19	3 45 3	19 42 32
6.	5 46 30	17 41 5	5 14 59	18 12 36	4 55 51	18 31 44	4 42 14	18 45 21	4 55 51	18 31 44	4 42 14	18 45 21	4 31 11	18 56 24	3 47 C	19 40 35
8.	5 48 34	17 39 1	5 16 56	18 10 39	4 57 44	18 29 51	4 44 5	18 43 30	4 57 44	18 29 51	4 44 5	18 43 30	4 33 1	18 54 34	3 48 48	19 38 47
10.	5 50 39	17 36 58	5 18 51	18 8 44	4 59 35	18 28 0	4 45 52	18 41 43	4 59 35	18 28 0	4 45 52	18 41 43	4 34 46	18 52 49	3 50 27	19 37 8
12.	5 52 45	17 34 50	5 20 45	18 6 50	5 1 22	18 26 13	4 47 35	18 40 0	5 1 22	18 26 13	4 47 35	18 40 0	4 36 26	18 51 9	3 51 57	19 35 38
14.	5 54 53	17 32 42	5 22 38	18 4 57	5 3 7	18 24 28	4 49 15	18 38 20	5 3 7	18 24 28	4 49 15	18 38 20	4 38 2	18 49 33	3 53 17	19 34 18
16.	5 57 3	17 30 32	5 24 30	18 3 5	5 4 49	18 22 46	4 50 50	18 36 45	5 4 49	18 22 46	4 50 50	18 36 45	4 39 32	18 48 3	3 54 29	19 33 6
18.	5 59 16	17 28 19	5 26 22	18 1 13	5 6 29	18 21 6	4 52 23	18 35 12	5 6 29	18 21 6	4 52 23	18 35 12	4 40 58	18 46 37	3 55 32	19 32 3
20.	6 1 31	17 26 4	5 28 13	17 59 22	5 8 7	18 19 28	4 53 52	18 33 43	5 8 7	18 19 28	4 53 52	18 33 43	4 42 20	18 45 15	3 56 26	19 31 9
22.	6 3 50	17 23 45	5 30 4	17 57 31	5 9 43	18 17 52	4 55 17	18 32 18	5 9 43	18 17 52	4 55 17	18 32 18	4 43 37	18 43 58	3 57 11	19 30 24
24.	6 6 12	17 21 23	5 31 56	17 55 39	5 11 18	18 16 17	4 56 40	18 30 55	5 11 18	18 16 17	4 56 40	18 30 55	4 44 51	18 42 44	3 57 46	19 29 49
26.	6 8 39	17 18 56	5 33 49	17 53 46	5 12 51	18 14 44	4 57 59	18 29 36	5 12 51	18 14 44	4 57 59	18 29 36	4 45 59	18 41 36	3 58 12	19 29 23
28.	6 11 11	17 16 24	5 35 42	17 51 53	5 14 22	18 13 13	4 59 16	18 28 19	5 14 22	18 13 13	4 59 16	18 28 19	4 47 4	18 40 31	3 58 28	19 29 7
30.	6 13 48	17 13 47	5 37 37	17 49 58	5 15 53	18 11 42	5 0 30	18 27 5	5 15 53	18 11 42	5 0 30	18 27 5	4 48 4	18 39 31	3 58 34	19 29 1
32.	6 16 22	17 11 3	5 39 33	17 48 2	5 17 22	18 10 13	5 1 40	18 25 55	5 17 22	18 10 13	5 1 40	18 25 55	4 49 0	18 38 35	3 58 28	19 29 7
34.	6 18 23	17 8 12	5 41 32	17 46 3	5 18 51	18 8 44	5 2 48	18 24 47	5 18 51	18 8 44	5 2 48	18 24 47	4 49 51	18 37 44	3 58 11	19 29 24
36.	6 22 23	17 5 12	5 43 33	17 44 2	5 20 19	18 7 16	5 3 53	18 23 42	5 20 19	18 7 16	5 3 53	18 23 42	4 50 37	18 36 58	3 57 41	19 29 54
38.	6 25 32	17 2 3	5 45 37	17 41 58	5 21 47	18 5 48	5 4 55	18 22 40	5 21 47	18 5 48	5 4 55	18 22 40	4 51 19	18 36 16	3 56 57	19 30 38
40.	6 28 51	16 58 44	5 47 45	17 39 50	5 23 14	18 4 21	5 5 54	18 21 41	5 23 14	18 4 21	5 5 54	18 21 41	4 51 55	18 35 40	3 55 59	19 31 36
42.	6 32 24	16 55 11	5 49 57	17 37 38	5 24 41	18 2 54	5 6 50	18 20 45	5 24 41	18 2 54	5 6 50	18 20 45	4 52 25	18 35 10	3 54 43	19 32 52
44.	6 36 10	16 51 25	5 52 15	17 35 20	5 26 8	18 1 27	5 7 43	18 19 52	5 26 8	18 1 27	5 7 43	18 19 52	4 52 50	18 34 45	3 53 9	19 34 26
46.	6 40 12	16 47 23	5 54 38	17 32 57	5 27 36	17 59 59	5 8 32	18 19 3	5 27 36	17 59 59	5 8 32	18 19 3	4 53 18	18 34 27	3 51 14	19 36 21
48.	6 44 34	16 42 1	5 57 8	17 30 27	5 29 5	17 58 30	5 9 17	18 18 18	5 29 5	17 58 30	5 9 17	18 18 18	4 53 8	18 34 17	3 48 55	19 38 40
50.	6 49 18	16 38 17	5 59 47	17 27 48	5 30 34	17 57 1	5 9 59	18 17 36	5 30 34	17 57 1	5 9 59	18 17 36	4 53 21	18 34 14	3 46 9	19 41 26
52.	6 54 28	16 33 7	6 2 25	17 25 0	5 32 5	17 55 30	5 10 36	18 16 59	5 32 5	17 55 30	5 10 36	18 16 59	4 53 14	18 34 21	3 42 51	19 44 44
54.	7 0 9	16 27 26	6 5 35	17 22 0	5 33 38	17 53 57	5 11 8	18 16 27	5 33 38	17 53 57	5 11 8	18 16 27	4 52 57	18 34 38	3 38 55	19 48 40
56.	7 6 28	16 21 7	6 8 49	17 18 46	5 35 13	17 52 22	5 11 35	18 16 0	5 35 13	17 52 22	5 11 35	18 16 0	4 52 28	18 35 7	3 34 15	19 53 20
58.	7 13 32	16 14 3	6 12 20	17 15 15	5 36 51	17 50 44	5 11 55	18 15 40	5 36 51	17 50 44	5 11 55	18 15 40	4 51 44	18 35 51	3 28 40	19 58 55
60.	7 21 33	16 6 2	6 16 11	17 11 24	5 38 33	17 49 2	5 12 8	18 15 27	5 38 33	17 49 2	5 12 8	18 15 27	4 50 44	18 36 51	3 21 58	20 5 37
62.	7 30 44	15 56 51	6 20 27	17 7 8	5 40 19	17 47 16	5 12 11	18 15 24	5 40 19	17 47 16	5 12 11	18 15 24	4 49 24	18 38 11	3 13 51	20 13 44
64.	7 41 25	15 46 10	6 25 14	17 2 21	5 42 12	17 45 23	5 12 5	18 15 30	5 42 12	17 45 23	5 12 5	18 15 30	4 47 39	18 39 56	3 3 54	20 23 41
66.	7 54 7	15 33 28	6 30 40	16 56 55	5 44 12	17 43 23	5 11 45	18 15 50	5 44 12	17 43 23	5 11 45	18 15 50	4 45 23	18 42 12	2 51 26	20 36 9
68.	8 9 23	15 18 2	6 36 56	16 50 39	5 46 23	17 41 12	5 11 8	18 16 27	5 46 23	17 41 12	5 11 8	18 16 27	4 42 28	18 45 7	2 35 27	20 52 8
70.	8 28 59	14 58 36	6 44 20	16 43 15	5 48 46	17 38 49	5 10 10	18 17 25	5 48 46	17 38 49	5 10 10	18 17 25	4 38 42	18 48 53	2 14 0	21 13 35
72.	8 54 40	14 32 55	6 53 14	16 34 21	5 51 28	17 36 7	5 8 44	18 18 51	5 51 28	17 36 7	5 8 44	18 18 51	4 33 47	18 53 48	1 42 52	21 44 43
74.	9 31 54	13 55 41	7 4 17	16 23 18	5 54 34	17 33 1	5 6 40	18 20 55	5 54 34	17 33 1	5 6 40	18 20 55	4 27 17	19 0 18	0 45 47	22 41 48
76.	10 43 20	12 44 15	7 18 29	16 9 6	5 58 16	17 29 19	5 3 39	18 23 56	5 58 16	17 29 19	5 3 39	18 23 56	4 18 28	19 9 7	0 0 0	24 0 0
78.	C C C	12 4 15	7 37 43	15 49 52	6 2 52	17 24 43	4 59 16	18 28 19	6 2 52	17 24 43	4 59 16	18 28 19	4 6 4	19 21 31	0 0 0	24 0 0
80.	C C C	24 C C	8 5 48	15 21 47	6 8 54	17 18 41	4 52 39	18 34 56	6 8 54	17 18 41	4 52 39	18 34 56	3 47 39	20 9 56	0 0 0	24 0 0
82.	C C C	24 C C	8 52 54	14 34 41	6 17 29	17 10 6	4 42 4	18 45 31	6 17 29	17 10 6	4 42 4	18 45 31	3 17 35	20 10 0	0 0 0	24 0 0
84.	C C C	24 C C	11 9 C	12 18 35	6 31 13	16 56 22	4 23 21	19 4 14	6 31 13	16 56 22	4 23 21	19 4 14	2 17 51	21 9 44	0 0 0	24 0 0
86.	C C C	24 C C	C C C	24 C C	6 58 12	16 29 23	3 42 45	19 44 50	6 58 12	16 29 23	3 42 45	19 44 50	C 0 0	24 0 0	0 0 0	24 0 0
88.	C C C	24 C C	C C C	24 C C	8 26 11	15 1 24	0 9 57	23 17 38	8 26 11	15 1 24	0 9 57	23 17 38	C 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

[illegible]

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = 0.		100.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5 40 53	17 47 54	5 8 48	18 15 59	4 49 16	18 39 31	4 35 19	18 53 28	4 23 59	19 4 48
2.	5 43 23	17 45 14	5 11 29	18 17 18	4 51 58	18 36 49	4 38 3	18 50 44	4 26 46	19 2 1
4.	5 46 13	17 42 34	5 14 7	18 14 40	4 54 37	18 34 10	4 40 43	18 48 4	4 29 26	18 59 21
6.	5 48 53	17 39 54	5 16 43	18 12 4	4 57 11	18 31 36	4 43 17	18 45 30	4 32 1	18 56 46
8.	5 51 35	17 37 12	5 19 17	18 9 30	4 59 43	18 29 4	4 45 47	18 43 0	4 34 30	18 54 17
10.	5 54 18	17 34 29	5 21 50	18 6 57	5 2 11	18 26 36	4 48 13	18 40 34	4 36 54	18 51 53
12.	5 57 3	17 31 44	5 24 23	18 4 24	5 4 37	18 24 10	4 50 35	18 38 12	4 39 14	18 49 33
14.	5 59 50	17 28 57	5 26 54	18 1 53	5 7 0	18 21 47	4 52 53	18 35 54	4 41 28	18 47 19
16.	6 2 40	17 26 7	5 29 25	17 59 22	5 9 22	18 19 25	4 55 9	18 33 38	4 43 39	18 45 8
18.	6 5 33	17 23 14	5 31 57	17 56 50	5 11 42	18 17 5	4 57 21	18 31 26	4 45 45	18 43 2
20.	6 8 31	17 20 16	5 34 29	17 54 18	5 14 1	18 14 46	4 59 31	18 29 16	4 47 48	18 40 59
22.	6 11 32	17 17 13	5 37 2	17 51 45	5 16 18	18 12 29	5 1 38	18 27 9	4 49 47	18 39 0
24.	6 14 35	17 14 8	5 39 37	17 49 10	5 18 35	18 10 12	5 3 43	18 25 4	4 51 43	18 37 4
26.	6 17 52	17 10 55	5 42 14	17 46 33	5 20 52	18 7 55	5 5 47	18 23 0	4 53 36	18 35 11
28.	6 21 12	17 7 35	5 44 53	17 43 54	5 23 9	18 5 38	5 7 48	18 20 59	4 55 26	18 33 21
30.	6 24 40	17 4 7	5 47 35	17 41 12	5 25 26	18 3 21	5 9 49	18 18 58	4 57 13	18 31 34
32.	6 28 16	17 0 31	5 50 21	17 38 26	5 27 44	18 1 3	5 11 48	18 16 59	4 58 57	18 29 50
34.	6 32 2	16 56 45	5 53 11	17 35 36	5 30 4	17 58 43	5 13 46	18 15 1	5 0 39	18 28 8
36.	6 36 0	16 52 47	5 56 6	17 32 41	5 32 25	17 56 22	5 15 44	18 13 3	5 2 18	18 26 29
38.	6 40 11	16 48 36	5 59 8	17 29 39	5 34 48	17 53 59	5 17 41	18 11 6	5 3 55	18 24 52
40.	6 44 37	16 44 10	6 2 16	17 26 31	5 37 14	17 51 33	5 19 39	18 9 8	5 5 30	18 23 17
42.	6 49 20	16 39 27	6 5 32	17 23 15	5 39 43	17 49 4	5 21 36	18 7 11	5 7 2	18 21 45
44.	6 54 23	16 34 24	6 8 58	17 19 49	5 42 17	17 46 30	5 23 34	18 5 13	5 8 32	18 20 15
46.	6 59 49	16 28 58	6 12 34	17 16 13	5 44 55	17 43 52	5 25 33	18 3 14	5 10 0	18 18 47
48.	7 5 42	16 23 5	6 16 24	17 12 23	5 47 39	17 41 8	5 27 34	18 1 13	5 11 25	18 17 22
50.	7 12 7	16 16 40	6 20 28	17 8 19	5 50 31	17 38 16	5 29 36	17 59 11	5 12 49	18 15 58
52.	7 19 10	16 9 37	6 24 50	17 3 57	5 53 31	17 35 16	5 31 41	17 57 6	5 14 10	18 14 37
54.	7 26 59	16 1 48	6 29 34	16 59 13	5 56 41	17 32 6	5 33 48	17 54 59	5 15 28	18 13 19
56.	7 35 43	15 53 4	6 34 42	16 54 5	6 0 3	17 28 44	5 36 0	17 52 47	5 16 45	18 12 2
58.	7 45 37	15 42 10	6 40 21	16 48 26	6 3 41	17 25 7	5 38 17	17 50 30	5 17 58	18 10 49
60.	7 57 0	15 31 47	6 46 37	16 42 10	6 7 35	17 21 12	5 40 40	17 48 7	5 19 9	18 9 38
62.	8 10 16	15 18 31	6 53 40	16 35 7	6 11 52	17 16 55	5 43 11	17 45 36	5 20 16	18 8 31
64.	8 26 9	15 2 38	7 1 40	16 27 7	6 16 37	17 12 10	5 45 51	17 42 56	5 21 20	18 7 27
66.	8 45 43	14 43 4	7 10 55	16 17 52	6 21 57	17 6 50	5 48 44	17 40 3	5 22 19	18 6 28
68.	9 11 1	14 17 46	7 21 49	16 6 58	6 28 2	17 0 45	5 51 54	17 36 53	5 23 13	18 5 34
70.	9 46 47	13 42 0	7 34 57	15 53 50	6 35 6	16 53 41	5 55 24	17 33 23	5 24 0	18 4 47
72.	10 54 37	12 34 10	7 51 15	15 37 32	6 43 32	16 45 15	5 59 24	17 29 23	5 24 38	18 4 9
74.	C C C	12 24 C	8 12 22	15 16 23	6 53 51	16 34 56	6 4 3	17 24 44	5 25 3	18 3 42
76.	C C C	12 14 C	8 41 28	14 47 19	7 6 57	16 21 50	6 9 4	17 19 7	5 25 14	18 3 33
78.	C C C	12 4 C	9 26 39	14 2 8	7 24 25	16 4 22	6 16 45	17 12 2	5 25 0	18 3 47
80.	C C C	12 24 C	C C C	13 24 C	7 49 25	15 39 22	6 26 10	17 2 37	5 24 6	18 4 41
82.	C C C	12 24 C	C C C	13 24 C	8 25 44	14 59 3	6 39 45	16 49 2	5 22 4	18 6 43
84.	C C C	12 24 C	C C C	13 24 C	9 57 21	13 31 26	7 1 58	16 26 49	5 17 47	18 11 C
86.	C C C	12 24 C	C C C	13 24 C	C C C	12 24 C	7 47 35	15 41 12	5 7 47	18 21 C
88.	C C C	12 24 C	C C C	13 24 C	C C C	12 24 C	C C C	15 24 C	4 34 28	18 54 19

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	62	12	1	HEIGHT = C.	DECLINATION OF SUN AT MCCN -21.77	EQUATION OF TIME 0.19	1000.	300.	400.	1000.
				SCREEN HEIGHT = C.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
LAT										
-88.	1	11	125	24	0	0	0	0	0	0
-86.	1	13	47	24	0	0	0	0	0	0
-84.	1	15	36	24	0	0	0	0	0	0
-82.	1	17	23	24	0	0	0	0	0	0
-80.	1	19	9	24	0	0	0	0	0	0
-78.	1	21	25	24	0	0	0	0	0	0
-76.	1	23	40	24	0	0	0	0	0	0
-74.	1	25	53	24	0	0	0	0	0	0
-72.	1	27	6	24	0	0	0	0	0	0
-70.	1	29	18	24	0	0	0	0	0	0
-68.	1	31	29	24	0	0	0	0	0	0
-66.	1	33	41	24	0	0	0	0	0	0
-64.	1	35	53	24	0	0	0	0	0	0
-62.	1	37	5	24	0	0	0	0	0	0
-60.	1	39	17	24	0	0	0	0	0	0
-58.	1	41	29	24	0	0	0	0	0	0
-56.	1	43	41	24	0	0	0	0	0	0
-54.	1	45	53	24	0	0	0	0	0	0
-52.	1	47	5	24	0	0	0	0	0	0
-50.	1	49	17	24	0	0	0	0	0	0
-48.	1	51	29	24	0	0	0	0	0	0
-46.	1	53	41	24	0	0	0	0	0	0
-44.	1	55	53	24	0	0	0	0	0	0
-42.	1	57	5	24	0	0	0	0	0	0
-40.	1	59	17	24	0	0	0	0	0	0
-38.	1	61	29	24	0	0	0	0	0	0
-36.	1	63	41	24	0	0	0	0	0	0
-34.	1	65	53	24	0	0	0	0	0	0
-32.	1	67	5	24	0	0	0	0	0	0
-30.	1	69	17	24	0	0	0	0	0	0
-28.	1	71	29	24	0	0	0	0	0	0
-26.	1	73	41	24	0	0	0	0	0	0
-24.	1	75	53	24	0	0	0	0	0	0
-22.	1	77	5	24	0	0	0	0	0	0
-20.	1	79	17	24	0	0	0	0	0	0
-18.	1	81	29	24	0	0	0	0	0	0
-16.	1	83	41	24	0	0	0	0	0	0
-14.	1	85	53	24	0	0	0	0	0	0
-12.	1	87	5	24	0	0	0	0	0	0
-10.	1	89	17	24	0	0	0	0	0	0
-8.	1	91	29	24	0	0	0	0	0	0
-6.	1	93	41	24	0	0	0	0	0	0
-4.	1	95	53	24	0	0	0	0	0	0
-2.	1	97	5	24	0	0	0	0	0	0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = 0.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5 45	17 52	5 12	18 24	4 52	18 44	4 37	18 59	4 26	19 10	3 39	19 30
2.	5 46	17 52	5 13	18 24	4 53	18 44	4 41	18 59	4 29	19 10	3 43	19 30
4.	5 47	17 52	5 14	18 24	4 54	18 44	4 42	18 59	4 30	19 10	3 46	19 30
6.	5 48	17 52	5 15	18 24	4 55	18 44	4 43	18 59	4 31	19 10	3 49	19 30
8.	5 49	17 52	5 16	18 24	4 56	18 44	4 44	18 59	4 32	19 10	3 52	19 30
10.	5 50	17 52	5 17	18 24	4 57	18 44	4 45	18 59	4 33	19 10	3 55	19 30
12.	5 51	17 52	5 18	18 24	4 58	18 44	4 46	18 59	4 34	19 10	3 58	19 30
14.	5 52	17 52	5 19	18 24	4 59	18 44	4 47	18 59	4 35	19 10	4 01	19 30
16.	5 53	17 52	5 20	18 24	5 00	18 44	4 48	18 59	4 36	19 10	4 04	19 30
18.	5 54	17 52	5 21	18 24	5 01	18 44	4 49	18 59	4 37	19 10	4 07	19 30
20.	5 55	17 52	5 22	18 24	5 02	18 44	4 50	18 59	4 38	19 10	4 10	19 30
22.	5 56	17 52	5 23	18 24	5 03	18 44	4 51	18 59	4 39	19 10	4 13	19 30
24.	5 57	17 52	5 24	18 24	5 04	18 44	4 52	18 59	4 40	19 10	4 16	19 30
26.	5 58	17 52	5 25	18 24	5 05	18 44	4 53	18 59	4 41	19 10	4 19	19 30
28.	5 59	17 52	5 26	18 24	5 06	18 44	4 54	18 59	4 42	19 10	4 22	19 30
30.	5 60	17 52	5 27	18 24	5 07	18 44	4 55	18 59	4 43	19 10	4 25	19 30
32.	5 61	17 52	5 28	18 24	5 08	18 44	4 56	18 59	4 44	19 10	4 28	19 30
34.	5 62	17 52	5 29	18 24	5 09	18 44	4 57	18 59	4 45	19 10	4 31	19 30
36.	5 63	17 52	5 30	18 24	5 10	18 44	4 58	18 59	4 46	19 10	4 34	19 30
38.	5 64	17 52	5 31	18 24	5 11	18 44	4 59	18 59	4 47	19 10	4 37	19 30
40.	5 65	17 52	5 32	18 24	5 12	18 44	4 60	18 59	4 48	19 10	4 40	19 30
42.	5 66	17 52	5 33	18 24	5 13	18 44	4 61	18 59	4 49	19 10	4 43	19 30
44.	5 67	17 52	5 34	18 24	5 14	18 44	4 62	18 59	4 50	19 10	4 46	19 30
46.	5 68	17 52	5 35	18 24	5 15	18 44	4 63	18 59	4 51	19 10	4 49	19 30
48.	5 69	17 52	5 36	18 24	5 16	18 44	4 64	18 59	4 52	19 10	4 52	19 30
50.	5 70	17 52	5 37	18 24	5 17	18 44	4 65	18 59	4 53	19 10	4 55	19 30
52.	5 71	17 52	5 38	18 24	5 18	18 44	4 66	18 59	4 54	19 10	4 58	19 30
54.	5 72	17 52	5 39	18 24	5 19	18 44	4 67	18 59	4 55	19 10	4 61	19 30
56.	5 73	17 52	5 40	18 24	5 20	18 44	4 68	18 59	4 56	19 10	4 64	19 30
58.	5 74	17 52	5 41	18 24	5 21	18 44	4 69	18 59	4 57	19 10	4 67	19 30
60.	5 75	17 52	5 42	18 24	5 22	18 44	4 70	18 59	4 58	19 10	4 70	19 30
62.	5 76	17 52	5 43	18 24	5 23	18 44	4 71	18 59	4 59	19 10	4 73	19 30
64.	5 77	17 52	5 44	18 24	5 24	18 44	4 72	18 59	4 60	19 10	4 76	19 30
66.	5 78	17 52	5 45	18 24	5 25	18 44	4 73	18 59	4 61	19 10	4 79	19 30
68.	5 79	17 52	5 46	18 24	5 26	18 44	4 74	18 59	4 62	19 10	4 82	19 30
70.	5 80	17 52	5 47	18 24	5 27	18 44	4 75	18 59	4 63	19 10	4 85	19 30
72.	5 81	17 52	5 48	18 24	5 28	18 44	4 76	18 59	4 64	19 10	4 88	19 30
74.	5 82	17 52	5 49	18 24	5 29	18 44	4 77	18 59	4 65	19 10	4 91	19 30
76.	5 83	17 52	5 50	18 24	5 30	18 44	4 78	18 59	4 66	19 10	4 94	19 30
78.	5 84	17 52	5 51	18 24	5 31	18 44	4 79	18 59	4 67	19 10	4 97	19 30
80.	5 85	17 52	5 52	18 24	5 32	18 44	4 80	18 59	4 68	19 10	5 00	19 30
82.	5 86	17 52	5 53	18 24	5 33	18 44	4 81	18 59	4 69	19 10	5 03	19 30
84.	5 87	17 52	5 54	18 24	5 34	18 44	4 82	18 59	4 70	19 10	5 06	19 30
86.	5 88	17 52	5 55	18 24	5 35	18 44	4 83	18 59	4 71	19 10	5 09	19 30
88.	5 89	17 52	5 56	18 24	5 36	18 44	4 84	18 59	4 72	19 10	5 12	19 30

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	HEIGHT = 0.		DECLINATION OF SUN AT NOON -23.26		EQUATION OF TIME 0.09		1000.		400.		300.	
		SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
62 12 15	-88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-72.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-70.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-68.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-66.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-64.	1 28 26	22 20 45	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-62.	2 30 58	21 18 13	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-60.	2 51 8	20 36 3	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-58.	3 7 42	20 41 29	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-56.	3 21 46	20 27 25	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-54.	3 33 37	20 15 14	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-52.	3 44 43	20 4 28	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-50.	3 54 19	19 54 52	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-48.	4 3 0	19 46 11	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-46.	4 10 55	19 36 16	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-44.	4 18 12	19 30 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-42.	4 24 56	19 24 15	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-40.	4 31 12	19 17 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-38.	4 37 4	19 12 7	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-36.	4 42 36	19 6 35	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-34.	4 47 49	19 1 22	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-32.	4 52 47	18 56 24	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-30.	4 57 31	18 51 40	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-28.	5 2 3	18 47 8	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-26.	5 6 24	18 42 47	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-24.	5 10 37	18 38 34	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-22.	5 14 41	18 34 30	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-20.	5 18 27	18 30 34	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-18.	5 22 28	18 26 43	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-16.	5 26 13	18 22 58	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-14.	5 29 54	18 19 17	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-12.	5 33 37	18 15 40	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-10.	5 37 4	18 12 7	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-8.	5 40 35	18 8 36	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-6.	5 44 4	18 5 1	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
	-2.	5 47 31	18 1 16	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN HEIGHT = C.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 50 58	17 18 13	5 17 50	18 31 21	4 57 36	18 51 33	4 43 11	19 6 0	4 31 26	19 17 45	3 43 55	20 5 16
2.	5 54 24	17 34 47	5 21 18	18 27 53	5 1 38	18 48 3	4 46 45	19 2 26	4 35 3	19 14 8	3 47 54	20 1 17
4.	5 57 51	17 51 20	5 24 43	18 24 28	5 4 34	18 44 37	4 50 12	18 58 59	4 38 33	19 10 38	3 51 40	19 57 31
6.	6 1 18	17 47 53	5 28 5	18 21 6	5 7 56	18 41 15	4 53 35	18 55 36	4 41 57	19 7 14	3 55 14	19 53 57
8.	6 4 47	17 44 24	5 31 26	18 17 45	5 11 15	18 37 56	4 56 53	18 52 18	4 45 15	19 3 56	3 58 38	19 50 33
10.	6 8 17	17 40 54	5 34 47	18 14 24	5 14 30	18 34 41	5 0 17	18 49 4	4 48 27	19 0 44	4 1 51	19 47 20
12.	6 11 50	17 37 21	5 38 6	18 11 5	5 17 44	18 31 27	5 3 17	18 45 54	4 51 35	18 57 36	4 4 54	19 44 15
14.	6 15 27	17 33 44	5 41 26	18 7 45	5 20 56	18 28 15	5 6 23	18 42 48	4 54 38	18 54 33	4 7 51	19 41 20
16.	6 19 7	17 30 4	5 44 46	18 4 25	5 24 8	18 25 5	5 9 28	18 39 43	4 57 36	18 51 33	4 10 37	19 38 34
18.	6 22 51	17 26 20	5 48 7	18 1 4	5 27 18	18 21 56	5 12 29	18 36 42	5 0 34	18 48 37	4 13 16	19 35 55
20.	6 26 41	17 22 30	5 51 30	17 57 41	5 30 24	18 18 47	5 15 29	18 33 42	5 3 28	18 45 43	4 15 46	19 33 25
22.	6 30 38	17 18 33	5 54 55	17 54 16	5 33 33	18 15 38	5 18 28	18 30 43	5 6 18	18 42 53	4 18 9	19 31 2
24.	6 34 41	17 14 30	5 58 23	17 50 48	5 36 43	18 12 28	5 21 26	18 27 45	5 9 7	18 40 4	4 20 25	19 28 46
26.	6 38 53	17 10 18	6 1 55	17 47 16	5 39 54	18 9 17	5 24 23	18 24 48	5 11 54	18 37 17	4 22 33	19 26 38
28.	6 43 14	17 5 57	6 5 32	17 43 39	5 42 7	18 6 4	5 27 20	18 21 51	5 14 39	18 34 32	4 24 34	19 24 37
30.	6 47 45	17 1 26	6 9 13	17 39 58	5 46 22	18 2 49	5 30 18	18 18 53	5 17 23	18 31 48	4 26 28	19 22 43
32.	6 52 29	16 56 42	6 13 1	17 36 10	5 49 40	17 59 31	5 33 16	18 15 55	5 20 6	18 29 5	4 28 15	19 20 56
34.	6 57 27	16 51 44	6 16 56	17 32 15	5 53 2	17 56 9	5 36 16	18 12 55	5 22 49	18 26 22	4 29 55	19 19 16
36.	7 2 41	16 46 30	6 20 59	17 28 12	5 56 28	17 52 43	5 39 19	18 9 52	5 25 33	18 23 38	4 31 27	19 17 44
38.	7 7 8	16 41 58	6 25 12	17 23 59	6 0 0	17 49 11	5 42 34	18 6 47	5 28 17	18 20 54	4 32 51	19 16 20
40.	7 14 6	16 36 5	6 29 37	17 19 34	6 3 39	17 45 32	5 45 32	18 3 39	5 31 2	18 18 9	4 34 7	19 15 4
42.	7 20 24	16 28 47	6 34 15	17 14 56	6 7 26	17 41 45	5 48 45	18 0 26	5 33 48	18 15 23	4 35 15	19 13 56
44.	7 27 10	16 22 1	6 39 8	17 10 3	6 11 22	17 37 50	5 52 3	17 57 8	5 36 38	18 12 33	4 36 14	19 12 57
46.	7 34 31	16 14 40	6 44 18	17 4 53	6 15 28	17 33 43	5 55 28	17 53 43	5 39 30	18 9 41	4 37 3	19 12 8
48.	7 42 31	16 6 40	6 49 50	16 55 21	6 19 47	17 29 24	5 59 0	17 50 11	5 42 26	18 6 45	4 37 41	19 11 30
50.	7 51 20	15 57 51	6 55 47	16 53 24	6 24 22	17 24 49	6 2 41	17 46 30	5 45 27	18 3 44	4 38 8	19 11 3
52.	8 1 7	15 48 4	7 2 13	16 46 58	6 29 14	17 19 57	6 6 34	17 42 37	5 48 34	18 0 37	4 38 21	19 10 50
54.	8 12 7	15 37 4	7 9 14	16 39 57	6 34 27	17 14 44	6 10 40	17 38 31	5 51 48	17 57 23	4 38 19	19 10 52
56.	8 24 36	15 24 33	7 16 57	16 32 14	6 40 7	17 9 4	6 15 1	17 34 10	5 55 11	17 54 0	4 38 0	19 11 11
58.	8 35 11	15 10 0	7 25 33	16 23 38	6 46 17	17 2 54	6 19 42	17 29 29	5 58 45	17 50 26	4 37 21	19 11 50
60.	8 56 27	14 52 44	7 35 13	16 13 58	6 53 5	16 56 6	6 24 47	17 24 24	6 2 32	17 46 39	4 36 18	19 12 53
62.	9 17 41	14 31 30	7 46 16	16 2 55	7 0 41	16 48 30	6 30 21	17 18 50	6 6 36	17 42 35	4 34 46	19 14 25
64.	9 45 20	14 3 51	7 59 7	15 50 4	7 5 16	16 39 55	6 36 32	17 12 39	6 11 2	17 38 9	4 32 39	19 16 32
66.	10 26 9	13 2 2	8 14 22	15 34 49	7 15 8	16 30 3	6 43 29	17 5 42	6 15 54	17 33 17	4 29 48	19 19 23
68.	C C C	24 C C	8 33 2	15 16 9	7 30 42	16 18 29	6 51 26	16 57 45	6 21 20	17 27 51	4 26 0	19 23 11
70.	C C C	24 C C	8 56 51	14 52 20	7 44 34	16 4 37	7 0 44	16 48 27	6 27 32	17 21 39	4 20 59	19 28 12
72.	C C C	24 C C	9 25 27	14 15 44	8 1 44	15 47 27	7 11 52	16 37 19	6 34 45	17 14 26	4 14 18	19 34 53
74.	C C C	24 C C	10 22 4	13 27 7	8 23 56	15 25 15	7 25 37	16 23 34	6 43 24	17 5 47	4 5 15	19 43 56
76.	C C C	24 C C	C C C	24 C C	8 54 34	14 54 37	7 43 18	16 5 53	6 54 8	16 55 3	3 52 42	19 56 29
78.	C C C	24 C C	C C C	24 C C	9 42 41	14 6 30	8 7 26	15 41 45	7 27 4	16 41 7	3 34 31	20 14 40
80.	C C C	24 C C	C C C	24 C C	C C C	24 C C	8 43 33	15 5 38	7 27 21	16 21 50	3 6 9	20 43 2
82.	C C C	24 C C	C C C	24 C C	C C C	24 C C	9 49 53	13 59 18	7 56 46	15 52 25	2 14 20	21 34 51
84.	C C C	24 C C	C C C	24 C C	C C C	24 C C	0 0 0	24 0 0	8 50 24	14 58 47	0 0 0	24 0 0
86.	C C C	24 C C	C C C	24 C C	C C C	24 C C	0 0 0	24 0 0	C C C	24 0 0	0 0 0	24 0 0
88.	C C C	24 C C	C C C	24 C C	C C C	24 C C	0 0 0	24 0 0	C C C	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

[illegible]

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = 0.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5 26 18	18 39 41	5 26 18	18 39 41	5 26 18	18 39 41	5 26 18	18 39 41	5 26 18	18 39 41	5 26 18	18 39 41
2.	5 29 43	18 36 16	5 29 43	18 36 16	5 29 43	18 36 16	5 29 43	18 36 16	5 29 43	18 36 16	5 29 43	18 36 16
4.	5 32 6	18 32 53	5 32 6	18 32 53	5 32 6	18 32 53	5 32 6	18 32 53	5 32 6	18 32 53	5 32 6	18 32 53
6.	5 36 26	18 29 23	5 36 26	18 29 23	5 36 26	18 29 23	5 36 26	18 29 23	5 36 26	18 29 23	5 36 26	18 29 23
8.	5 39 45	18 26 14	5 39 45	18 26 14	5 39 45	18 26 14	5 39 45	18 26 14	5 39 45	18 26 14	5 39 45	18 26 14
10.	5 43 3	18 22 56	5 43 3	18 22 56	5 43 3	18 22 56	5 43 3	18 22 56	5 43 3	18 22 56	5 43 3	18 22 56
12.	5 46 21	18 19 36	5 46 21	18 19 36	5 46 21	18 19 36	5 46 21	18 19 36	5 46 21	18 19 36	5 46 21	18 19 36
14.	5 49 36	18 16 21	5 49 36	18 16 21	5 49 36	18 16 21	5 49 36	18 16 21	5 49 36	18 16 21	5 49 36	18 16 21
16.	5 52 56	18 13 3	5 52 56	18 13 3	5 52 56	18 13 3	5 52 56	18 13 3	5 52 56	18 13 3	5 52 56	18 13 3
18.	5 56 15	18 9 44	5 56 15	18 9 44	5 56 15	18 9 44	5 56 15	18 9 44	5 56 15	18 9 44	5 56 15	18 9 44
20.	5 59 35	18 6 24	5 59 35	18 6 24	5 59 35	18 6 24	5 59 35	18 6 24	5 59 35	18 6 24	5 59 35	18 6 24
22.	6 2 54	17 59 35	6 2 54	17 59 35	6 2 54	17 59 35	6 2 54	17 59 35	6 2 54	17 59 35	6 2 54	17 59 35
24.	6 6 24	17 56 6	6 6 24	17 56 6	6 6 24	17 56 6	6 6 24	17 56 6	6 6 24	17 56 6	6 6 24	17 56 6
26.	6 9 53	17 52 33	6 9 53	17 52 33	6 9 53	17 52 33	6 9 53	17 52 33	6 9 53	17 52 33	6 9 53	17 52 33
28.	6 13 26	17 48 54	6 13 26	17 48 54	6 13 26	17 48 54	6 13 26	17 48 54	6 13 26	17 48 54	6 13 26	17 48 54
30.	6 17 5	17 45 5	6 17 5	17 45 5	6 17 5	17 45 5	6 17 5	17 45 5	6 17 5	17 45 5	6 17 5	17 45 5
32.	6 22 50	17 41 17	6 22 50	17 41 17	6 22 50	17 41 17	6 22 50	17 41 17	6 22 50	17 41 17	6 22 50	17 41 17
34.	6 27 42	17 37 17	6 27 42	17 37 17	6 27 42	17 37 17	6 27 42	17 37 17	6 27 42	17 37 17	6 27 42	17 37 17
36.	6 32 52	17 33 7	6 32 52	17 33 7	6 32 52	17 33 7	6 32 52	17 33 7	6 32 52	17 33 7	6 32 52	17 33 7
38.	6 37 13	17 28 13	6 37 13	17 28 13	6 37 13	17 28 13	6 37 13	17 28 13	6 37 13	17 28 13	6 37 13	17 28 13
40.	6 41 46	17 24 13	6 41 46	17 24 13	6 41 46	17 24 13	6 41 46	17 24 13	6 41 46	17 24 13	6 41 46	17 24 13
42.	6 46 35	17 19 24	6 46 35	17 19 24	6 46 35	17 19 24	6 46 35	17 19 24	6 46 35	17 19 24	6 46 35	17 19 24
44.	6 51 43	17 14 17	6 51 43	17 14 17	6 51 43	17 14 17	6 51 43	17 14 17	6 51 43	17 14 17	6 51 43	17 14 17
46.	6 57 8	17 8 51	6 57 8	17 8 51	6 57 8	17 8 51	6 57 8	17 8 51	6 57 8	17 8 51	6 57 8	17 8 51
48.	7 3 3	17 2 59	7 3 3	17 2 59	7 3 3	17 2 59	7 3 3	17 2 59	7 3 3	17 2 59	7 3 3	17 2 59
50.	7 9 19	16 56 40	7 9 19	16 56 40	7 9 19	16 56 40	7 9 19	16 56 40	7 9 19	16 56 40	7 9 19	16 56 40
52.	7 16 14	16 49 43	7 16 14	16 49 43	7 16 14	16 49 43	7 16 14	16 49 43	7 16 14	16 49 43	7 16 14	16 49 43
54.	7 23 49	16 42 10	7 23 49	16 42 10	7 23 49	16 42 10	7 23 49	16 42 10	7 23 49	16 42 10	7 23 49	16 42 10
56.	7 32 16	16 33 43	7 32 16	16 33 43	7 32 16	16 33 43	7 32 16	16 33 43	7 32 16	16 33 43	7 32 16	16 33 43
58.	7 41 46	16 24 13	7 41 46	16 24 13	7 41 46	16 24 13	7 41 46	16 24 13	7 41 46	16 24 13	7 41 46	16 24 13
60.	7 52 37	16 13 22	7 52 37	16 13 22	7 52 37	16 13 22	7 52 37	16 13 22	7 52 37	16 13 22	7 52 37	16 13 22
62.	8 5 11	16 2 48	8 5 11	16 2 48	8 5 11	16 2 48	8 5 11	16 2 48	8 5 11	16 2 48	8 5 11	16 2 48
64.	8 20 17	15 45 52	8 20 17	15 45 52	8 20 17	15 45 52	8 20 17	15 45 52	8 20 17	15 45 52	8 20 17	15 45 52
66.	8 38 19	15 37 40	8 38 19	15 37 40	8 38 19	15 37 40	8 38 19	15 37 40	8 38 19	15 37 40	8 38 19	15 37 40
68.	8 57 51	15 27 40	8 57 51	15 27 40	8 57 51	15 27 40	8 57 51	15 27 40	8 57 51	15 27 40	8 57 51	15 27 40
70.	9 17 27	15 15 4	9 17 27	15 15 4	9 17 27	15 15 4	9 17 27	15 15 4	9 17 27	15 15 4	9 17 27	15 15 4
72.	9 37 22	14 43 3	9 37 22	14 43 3	9 37 22	14 43 3	9 37 22	14 43 3	9 37 22	14 43 3	9 37 22	14 43 3
74.	9 58 22	14 33 51	9 58 22	14 33 51	9 58 22	14 33 51	9 58 22	14 33 51	9 58 22	14 33 51	9 58 22	14 33 51
76.	10 20 22	14 24 0	10 20 22	14 24 0	10 20 22	14 24 0	10 20 22	14 24 0	10 20 22	14 24 0	10 20 22	14 24 0
78.	10 43 3	14 16 5	10 43 3	14 16 5	10 43 3	14 16 5	10 43 3	14 16 5	10 43 3	14 16 5	10 43 3	14 16 5
80.	11 8 24	14 9 0	11 8 24	14 9 0	11 8 24	14 9 0	11 8 24	14 9 0	11 8 24	14 9 0	11 8 24	14 9 0
82.	11 34 24	14 0 0	11 34 24	14 0 0	11 34 24	14 0 0	11 34 24	14 0 0	11 34 24	14 0 0	11 34 24	14 0 0
84.	11 50 24	13 51 0	11 50 24	13 51 0	11 50 24	13 51 0	11 50 24	13 51 0	11 50 24	13 51 0	11 50 24	13 51 0
86.	12 7 24	13 42 0	12 7 24	13 42 0	12 7 24	13 42 0	12 7 24	13 42 0	12 7 24	13 42 0	12 7 24	13 42 0
88.	12 25 24	13 33 0	12 25 24	13 33 0	12 25 24	13 33 0	12 25 24	13 33 0	12 25 24	13 33 0	12 25 24	13 33 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	63	1	15	DECLINATION OF SUN AT NCN -21.20	100. 30.	200. 30.	EQUATION OF TIME -0.15	300. 30.	400. 30.	500. 30.	1000. 30.
LAT	SUNRISE	HEIGHT = C.	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-83.	47	16	22	22	24	24	24	24	24	24	24
-86.	47	16	21	21	24	24	24	24	24	24	24
-84.	47	16	21	21	24	24	24	24	24	24	24
-82.	47	16	21	21	24	24	24	24	24	24	24
-80.	47	16	21	21	24	24	24	24	24	24	24
-78.	47	16	21	21	24	24	24	24	24	24	24
-76.	47	16	21	21	24	24	24	24	24	24	24
-74.	47	16	21	21	24	24	24	24	24	24	24
-72.	47	16	21	21	24	24	24	24	24	24	24
-70.	47	16	21	21	24	24	24	24	24	24	24
-68.	47	16	21	21	24	24	24	24	24	24	24
-66.	47	16	21	21	24	24	24	24	24	24	24
-64.	47	16	21	21	24	24	24	24	24	24	24
-62.	47	16	21	21	24	24	24	24	24	24	24
-60.	47	16	21	21	24	24	24	24	24	24	24
-58.	47	16	21	21	24	24	24	24	24	24	24
-56.	47	16	21	21	24	24	24	24	24	24	24
-54.	47	16	21	21	24	24	24	24	24	24	24
-52.	47	16	21	21	24	24	24	24	24	24	24
-50.	47	16	21	21	24	24	24	24	24	24	24
-48.	47	16	21	21	24	24	24	24	24	24	24
-46.	47	16	21	21	24	24	24	24	24	24	24
-44.	47	16	21	21	24	24	24	24	24	24	24
-42.	47	16	21	21	24	24	24	24	24	24	24
-40.	47	16	21	21	24	24	24	24	24	24	24
-38.	47	16	21	21	24	24	24	24	24	24	24
-36.	47	16	21	21	24	24	24	24	24	24	24
-34.	47	16	21	21	24	24	24	24	24	24	24
-32.	47	16	21	21	24	24	24	24	24	24	24
-30.	47	16	21	21	24	24	24	24	24	24	24
-28.	47	16	21	21	24	24	24	24	24	24	24
-26.	47	16	21	21	24	24	24	24	24	24	24
-24.	47	16	21	21	24	24	24	24	24	24	24
-22.	47	16	21	21	24	24	24	24	24	24	24
-20.	47	16	21	21	24	24	24	24	24	24	24
-18.	47	16	21	21	24	24	24	24	24	24	24
-16.	47	16	21	21	24	24	24	24	24	24	24
-14.	47	16	21	21	24	24	24	24	24	24	24
-12.	47	16	21	21	24	24	24	24	24	24	24
-10.	47	16	21	21	24	24	24	24	24	24	24
-8.	47	16	21	21	24	24	24	24	24	24	24
-6.	47	16	21	21	24	24	24	24	24	24	24
-4.	47	16	21	21	24	24	24	24	24	24	24
-2.	47	16	21	21	24	24	24	24	24	24	24

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	SUNRISE	SUNSET	HEIGHT = C.	HEIGHT = C.	100.	200.	300.	400.	500.	600.	700.	800.	900.	1000.
						30.	30.	30.	30.	30.	30.	30.	30.	30.	30.
-0.	6	5 25	18 12 34	5 32 47	18 45 12	5 12 52	19 5 7	4 58 40	19 19 19	4 47 6	19 30 53	4 0 28	20 17 31	3 59 58	20 13 58
2.	6	8 31	18 5 28	5 35 54	18 42 5	5 16 2	19 1 57	5 1 52	19 16 7	4 50 22	19 27 37	4 0 28	20 17 31	3 59 58	20 13 58
4.	6	11 37	18 6 22	5 38 58	18 35 1	5 19 7	18 58 52	5 4 59	19 13 0	4 53 30	19 24 29	4 7 23	20 10 36	3 56 52	20 10 36
6.	6	14 44	18 3 15	5 42 1	18 35 58	5 22 9	18 55 50	5 8 0	19 9 59	4 56 32	19 21 27	4 10 34	20 7 25	3 53 58	20 7 25
8.	6	17 53	18 0 6	5 45 1	18 32 58	5 25 7	18 52 52	5 10 57	19 7 2	4 59 29	19 18 30	4 13 34	20 4 25	3 50 54	20 4 25
10.	6	21 2	17 56 57	5 48 1	18 29 58	5 28 2	18 47 4	5 13 59	19 1 20	5 2 20	19 15 39	4 16 25	20 1 34	3 47 50	20 1 34
12.	6	24 15	17 50 30	5 51 0	18 26 59	5 30 55	18 44 14	5 16 35	19 4 20	5 5 7	19 12 52	4 19 6	19 58 53	3 44 53	19 58 53
14.	6	27 29	17 47 11	5 53 59	18 24 1	5 33 45	18 41 14	5 19 25	18 58 34	5 7 49	19 10 10	4 21 38	19 56 21	3 41 57	19 56 21
16.	6	30 10	17 43 49	5 56 58	18 21 1	5 36 35	18 38 37	5 22 8	18 55 51	5 10 38	19 7 31	4 24 2	19 53 57	3 38 54	19 53 57
18.	6	33 10	17 40 22	5 59 57	18 18 1	5 39 24	18 35 49	5 24 4	18 53 11	5 13 3	19 4 56	4 26 18	19 51 41	3 35 52	19 51 41
20.	6	36 37	17 36 50	6 2 58	18 15 1	5 42 10	18 33 3	5 27 27	18 50 32	5 15 34	19 2 25	4 28 26	19 47 34	3 32 50	19 47 34
22.	6	41 9	17 33 11	6 6 9	18 11 58	5 44 56	18 30 16	5 30 3	18 47 56	5 18 2	18 59 57	4 30 25	19 45 42	3 29 57	19 45 42
24.	6	44 48	17 29 31	6 9 6	18 8 53	5 47 43	18 27 28	5 32 36	18 45 21	5 20 26	18 57 31	4 32 17	19 43 57	3 26 54	19 43 57
26.	6	48 24	17 25 31	6 12 13	18 5 46	5 50 31	18 24 40	5 35 12	18 42 47	5 22 51	18 55 8	4 34 2	19 43 57	3 23 51	19 43 57
28.	6	52 28	17 21 13	6 15 25	18 2 34	5 53 19	18 21 50	5 37 45	18 43 14	5 25 13	18 52 46	4 35 38	19 42 21	3 20 58	19 42 21
30.	6	56 52	17 17 13	6 18 41	17 55 18	5 56 5	18 17 58	5 40 18	18 37 41	5 27 32	18 50 27	4 37 7	19 40 52	3 17 55	19 40 52
32.	7	0 46	17 12 47	6 22 1	17 52 31	5 59 1	18 16 3	5 42 51	18 35 8	5 29 50	18 48 9	4 38 28	19 39 31	3 14 52	19 39 31
34.	7	5 12	17 8 7	6 25 28	17 48 57	6 4 54	18 13 5	5 45 24	18 32 35	5 32 7	18 45 52	4 39 40	19 38 19	3 11 59	19 38 19
36.	7	9 52	17 3 7	6 28 43	17 45 16	6 7 56	18 10 3	5 47 58	18 30 1	5 34 22	18 43 37	4 40 44	19 37 15	3 8 56	19 37 15
38.	7	14 48	16 57 56	6 32 42	17 41 23	6 11 3	18 6 59	5 50 34	18 27 25	5 36 37	18 41 22	4 41 39	19 36 20	3 5 53	19 36 20
40.	7	20 3	16 52 21	6 36 34	17 37 23	6 14 16	18 3 43	5 53 11	18 24 48	5 38 52	18 39 53	4 42 24	19 35 35	3 2 50	19 35 35
42.	7	25 38	16 46 20	6 40 36	17 33 8	6 17 36	18 0 23	5 56 35	18 19 24	5 41 6	18 36 53	4 43 0	19 34 59	3 0 57	19 34 59
44.	7	31 39	16 39 52	6 44 51	17 28 39	6 21 4	17 56 55	5 58 35	18 16 36	5 45 37	18 32 22	4 43 24	19 34 35	2 57 54	19 34 35
46.	7	37 45	16 32 49	6 49 7	17 23 52	6 24 42	17 53 17	6 4 15	18 13 44	5 47 54	18 30 5	4 43 36	19 34 24	2 54 51	19 34 24
48.	7	43 53	16 25 6	6 54 14	17 18 45	6 28 31	17 49 28	6 7 13	18 10 46	5 50 3	18 27 46	4 43 18	19 34 41	2 51 58	19 34 41
50.	8	1 25	16 18 34	6 59 14	17 13 15	6 32 34	17 45 25	6 10 19	18 7 40	5 52 34	18 25 25	4 42 45	19 35 14	2 48 56	19 35 14
52.	8	7 10	16 11 3	7 10 44	17 7 15	6 36 53	17 41 6	6 13 33	18 4 26	5 54 58	18 23 1	4 41 52	19 36 7	2 45 53	19 36 7
54.	8	12 40	15 56 19	7 17 18	17 0 41	6 41 32	17 36 27	6 16 58	18 1 1	5 57 26	18 20 33	4 40 37	19 37 22	2 42 50	19 37 22
56.	8	18 20	15 44 0	7 24 33	16 53 26	6 46 34	17 31 25	6 20 36	17 57 23	5 59 59	18 18 0	4 38 55	19 39 4	2 39 57	19 39 4
58.	8	24 32	15 35 39	7 32 41	16 45 18	6 52 6	17 25 53	6 24 30	17 53 29	6 2 39	18 15 20	4 36 41	19 41 18	2 36 54	19 41 18
60.	9	30 43	15 27 27	7 41 53	16 36 6	6 58 12	17 19 47	6 28 44	17 49 15	6 5 27	18 12 32	4 33 49	19 44 10	2 33 51	19 44 10
62.	9	36 53	15 19 16	7 52 26	16 25 31	7 5 4	17 12 55	6 33 31	17 39 28	6 8 24	18 9 35	4 30 8	19 47 51	2 30 58	19 47 51
64.	10	43 43	15 10 16	8 19 42	15 58 17	7 12 52	16 56 4	6 38 31	17 33 39	6 11 35	18 6 24	4 25 28	19 52 31	2 27 55	19 52 31
66.	10	50 53	14 42 16	8 28 4	15 39 55	7 21 55	16 45 22	6 44 20	17 33 39	6 15 2	18 2 57	4 19 29	19 58 30	2 24 52	19 58 30
68.	10	58 5	14 34 16	8 38 4	15 30 55	7 32 37	16 32 22	6 51 2	17 26 57	6 18 52	17 59 7	4 11 46	20 6 13	2 21 59	20 6 13
70.	10	67 5	14 24 0	8 48 5	15 21 5	7 43 45	16 22 2	6 58 55	17 19 4	6 23 12	17 54 47	4 1 39	20 16 20	2 18 56	20 16 20
72.	10	76 5	14 14 0	8 58 5	15 12 13	7 54 48	16 16 2	7 8 29	17 9 30	6 28 13	17 49 46	3 48 3	20 29 56	2 15 53	20 29 56
74.	10	85 5	14 4 0	9 10 5	15 3 37	8 5 48	15 54 35	7 20 29	16 57 30	6 34 15	17 43 44	3 28 58	20 49 1	2 12 50	20 49 1
76.	10	94 5	13 54 0	9 20 5	14 43 19	8 15 57	15 24 11	7 36 18	16 41 41	6 41 47	17 36 12	3 0 19	21 7 40	2 9 57	21 7 40
78.	10	103 5	13 44 0	9 30 5	14 33 37	8 25 53	15 14 35	7 58 33	16 19 26	6 51 47	17 26 12	2 0 17	22 7 42	2 6 54	22 7 42
80.	10	112 5	13 34 0	9 40 5	14 24 0	8 35 0	15 0 0	8 33 23	15 44 36	7 6 9	17 11 50	2 0 0	24 0 0	2 3 57	24 0 0
82.	10	121 5	13 24 0	9 50 5	14 14 0	8 45 0	14 54 0	8 41 34	14 36 25	7 29 34	16 48 25	1 0 0	24 0 0	2 13 59	24 0 0
84.	10	130 5	13 14 0	10 0 5	14 04 0	8 55 0	14 44 0	8 51 34	14 26 15	8 17 48	16 0 24	0 0 0	24 0 0	2 3 59	24 0 0
86.	10	139 5	13 04 0	10 10 5	13 54 0	9 5 0	14 34 0	9 0 34	14 16 5	8 27 58	15 0 24	0 0 0	24 0 0	2 13 59	24 0 0
88.	10	148 5	12 54 0	10 20 5	13 44 0	9 15 0	14 24 0	9 10 34	14 06 5	8 38 10	14 0 24	0 0 0	24 0 0	2 3 59	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	63	2	1	HEIGHT = 0.	DECLINATION OF SUN AT NOON	-17.22	200. 30.	EQUATION OF TIME -C.23	300. 30.	1000. 30.
LAT	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-86.	0	0	0	0	0	0	0	0	0	0
-86.	0	0	0	0	0	0	0	0	0	0
-84.	0	0	0	0	0	0	0	0	0	0
-84.	0	0	0	0	0	0	0	0	0	0
-80.	0	0	0	0	0	0	0	0	0	0
-80.	0	0	0	0	0	0	0	0	0	0
-76.	0	0	0	0	0	0	0	0	0	0
-76.	0	0	0	0	0	0	0	0	0	0
-74.	0	0	0	0	0	0	0	0	0	0
-74.	0	0	0	0	0	0	0	0	0	0
-70.	0	0	0	0	0	0	0	0	0	0
-70.	0	0	0	0	0	0	0	0	0	0
-68.	0	0	0	0	0	0	0	0	0	0
-68.	0	0	0	0	0	0	0	0	0	0
-64.	0	0	0	0	0	0	0	0	0	0
-64.	0	0	0	0	0	0	0	0	0	0
-62.	0	0	0	0	0	0	0	0	0	0
-62.	0	0	0	0	0	0	0	0	0	0
-58.	0	0	0	0	0	0	0	0	0	0
-58.	0	0	0	0	0	0	0	0	0	0
-56.	0	0	0	0	0	0	0	0	0	0
-56.	0	0	0	0	0	0	0	0	0	0
-54.	0	0	0	0	0	0	0	0	0	0
-54.	0	0	0	0	0	0	0	0	0	0
-50.	0	0	0	0	0	0	0	0	0	0
-50.	0	0	0	0	0	0	0	0	0	0
-46.	0	0	0	0	0	0	0	0	0	0
-46.	0	0	0	0	0	0	0	0	0	0
-44.	0	0	0	0	0	0	0	0	0	0
-44.	0	0	0	0	0	0	0	0	0	0
-42.	0	0	0	0	0	0	0	0	0	0
-42.	0	0	0	0	0	0	0	0	0	0
-38.	0	0	0	0	0	0	0	0	0	0
-38.	0	0	0	0	0	0	0	0	0	0
-36.	0	0	0	0	0	0	0	0	0	0
-36.	0	0	0	0	0	0	0	0	0	0
-32.	0	0	0	0	0	0	0	0	0	0
-32.	0	0	0	0	0	0	0	0	0	0
-30.	0	0	0	0	0	0	0	0	0	0
-30.	0	0	0	0	0	0	0	0	0	0
-26.	0	0	0	0	0	0	0	0	0	0
-26.	0	0	0	0	0	0	0	0	0	0
-22.	0	0	0	0	0	0	0	0	0	0
-22.	0	0	0	0	0	0	0	0	0	0
-18.	0	0	0	0	0	0	0	0	0	0
-18.	0	0	0	0	0	0	0	0	0	0
-14.	0	0	0	0	0	0	0	0	0	0
-14.	0	0	0	0	0	0	0	0	0	0
-12.	0	0	0	0	0	0	0	0	0	0
-12.	0	0	0	0	0	0	0	0	0	0
-8.	0	0	0	0	0	0	0	0	0	0
-8.	0	0	0	0	0	0	0	0	0	0
-6.	0	0	0	0	0	0	0	0	0	0
-6.	0	0	0	0	0	0	0	0	0	0
-4.	0	0	0	0	0	0	0	0	0	0
-4.	0	0	0	0	0	0	0	0	0	0
-2.	0	0	0	0	0	0	0	0	0	0
-2.	0	0	0	0	0	0	0	0	0	0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN HEIGHT = 0.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	6 10 18	18 17 17	5 38 27	18 49 8	5 19 3	19 8 32	5 5 12	19 22 23	4 53 57	19 33 38	4 8 41	20 18 54
-2.	6 12 47	18 14 48	5 40 56	18 46 39	5 21 34	19 3 1	5 7 45	19 17 23	4 56 32	19 31 3	4 11 30	20 16 5
4.	6 15 16	18 12 19	5 43 23	18 44 12	5 24 C	19 3 35	5 10 12	19 17 23	4 59 1	19 28 34	4 14 7	20 13 28
6.	6 17 45	18 9 50	5 45 48	18 41 47	5 26 24	19 1 11	5 12 35	19 15 0	5 1 24	19 26 11	4 16 34	20 11 1
8.	6 20 15	18 7 20	5 48 11	18 39 24	5 28 43	18 58 52	5 14 53	19 12 42	5 3 41	19 23 54	4 18 52	20 8 43
10.	6 22 47	18 4 48	5 50 32	18 37 3	5 31 C	18 56 35	5 17 7	19 10 28	5 5 53	19 21 42	4 21 0	20 6 35
12.	6 25 20	18 2 15	5 52 52	18 34 43	5 33 14	18 54 21	5 19 17	19 8 18	5 8 0	19 19 35	4 22 59	20 4 36
14.	6 27 55	17 59 40	5 55 12	18 32 23	5 35 26	18 52 9	5 21 24	19 6 11	5 10 3	19 17 32	4 24 49	20 2 46
16.	6 30 33	17 57 2	5 57 32	18 30 3	5 37 36	18 49 59	5 23 27	19 4 8	5 12 2	19 15 33	4 26 30	20 1 5
18.	6 33 14	17 54 21	5 59 51	18 27 44	5 39 44	18 47 51	5 25 28	19 2 7	5 13 56	19 13 39	4 28 3	19 59 32
20.	6 35 58	17 51 37	6 2 11	18 25 24	5 41 50	18 45 45	5 27 25	19 0 10	5 15 46	19 11 49	4 29 28	19 58 7
22.	6 38 47	17 48 48	6 4 31	18 23 4	5 43 55	18 43 40	5 29 20	18 58 15	5 17 33	19 10 2	4 30 43	19 56 52
24.	6 41 40	17 45 55	6 6 53	18 20 42	5 45 59	18 41 36	5 31 12	18 56 23	5 19 16	19 8 19	4 31 51	19 55 44
26.	6 44 39	17 43 56	6 9 16	18 18 19	5 48 3	18 39 32	5 33 2	18 54 33	5 20 55	19 6 40	4 32 49	19 54 46
28.	6 47 44	17 42 51	6 11 42	18 15 53	5 50 6	18 37 29	5 34 50	18 52 45	5 22 32	19 5 3	4 33 39	19 53 56
30.	6 50 56	17 42 39	6 14 9	18 13 26	5 52 9	18 35 26	5 36 36	18 50 59	5 24 4	19 3 31	4 34 34	19 53 16
32.	6 54 16	17 42 19	6 16 40	18 10 55	5 54 12	18 33 23	5 38 21	18 49 14	5 25 34	19 2 1	4 35 10	19 52 45
34.	6 57 46	17 42 9	6 19 15	18 8 20	5 56 16	18 31 19	5 40 4	18 47 31	5 27 1	19 0 34	4 35 10	19 52 25
36.	7 1 26	17 40 9	6 21 53	18 5 42	5 58 21	18 29 14	5 41 46	18 45 49	5 28 24	18 59 11	4 35 17	19 52 18
38.	7 5 17	17 38 18	6 24 37	18 2 58	6 2 36	18 27 7	5 43 27	18 44 8	5 29 44	18 57 51	4 35 17	19 52 15
40.	7 9 23	17 36 12	6 27 27	18 0 8	6 4 46	18 24 59	5 45 6	18 42 29	5 31 1	18 56 34	4 35 3	19 52 32
42.	7 13 44	17 34 51	6 30 24	17 57 11	6 7 C	18 22 49	5 46 45	18 40 50	5 32 15	18 55 20	4 34 34	19 53 1
44.	7 18 23	17 33 12	6 33 29	17 54 6	6 9 17	18 20 35	5 48 23	18 39 12	5 33 25	18 54 10	4 33 50	19 53 45
46.	7 23 23	17 31 42	6 36 43	17 50 52	6 11 38	18 15 57	5 51 39	18 35 56	5 35 35	18 52 0	4 31 30	19 56 5
48.	7 28 40	16 58 47	6 40 8	17 47 27	6 14 5	18 13 30	5 53 17	18 34 18	5 36 34	18 51 1	4 29 48	19 57 47
50.	7 34 41	16 52 54	6 43 46	17 43 49	6 16 37	18 10 58	5 54 55	18 32 40	5 37 29	18 50 6	4 27 42	19 59 53
52.	7 41 6	16 46 27	6 47 39	17 39 56	6 19 18	18 8 17	5 56 34	18 31 1	5 38 19	18 49 16	4 25 6	20 2 29
54.	7 48 16	16 39 19	6 51 51	17 35 24	6 22 7	18 5 28	5 58 14	18 29 21	5 39 3	18 48 32	4 21 56	20 5 39
56.	7 56 14	16 31 21	6 56 24	17 31 11	6 25 8	18 2 27	5 59 56	18 27 39	5 40 14	18 47 53	4 18 5	20 9 30
58.	8 5 13	16 22 22	7 1 23	17 26 12	6 28 24	17 59 13	6 1 40	18 25 55	5 40 14	18 47 21	4 13 24	20 14 11
60.	8 15 28	16 12 7	7 6 54	17 20 41	6 31 53	17 55 42	6 3 26	18 24 9	5 40 37	18 46 58	4 7 40	20 19 55
62.	8 27 23	15 46 7	7 13 4	17 14 31	6 35 45	17 51 50	6 5 16	18 22 19	5 40 51	18 46 44	4 0 39	20 26 56
64.	8 41 28	15 46 7	7 20 3	17 7 32	6 40 3	17 47 32	6 9 12	18 20 24	5 40 52	18 46 43	3 51 55	20 35 40
66.	8 58 35	15 29 0	7 28 5	16 55 30	6 44 56	17 42 39	6 11 22	18 16 13	5 40 38	18 46 57	3 40 53	20 46 42
68.	9 20 8	15 14 38	7 37 29	16 50 6	6 50 33	17 37 2	6 13 43	18 13 52	5 40 5	18 47 30	3 26 38	21 0 57
70.	9 49 0	14 38 35	8 2 31	16 25 4	6 57 10	17 30 25	6 16 20	18 11 15	5 39 6	18 48 29	3 7 32	21 20 3
72.	10 32 50	13 54 45	8 10 17	16 10 30	7 5 11	17 22 24	6 19 21	18 8 14	5 37 31	18 50 4	2 40 17	21 47 18
74.	11 1 0	13 30 0	8 20 5	15 43 58	7 15 15	17 12 20	6 22 56	18 4 39	5 35 6	18 52 29	1 55 39	22 31 56
76.	11 43 37	13 0 0	8 43 37	15 9 48	7 28 27	16 59 8	6 27 28	18 0 7	5 31 26	18 56 9	0 0 0	24 0 0
78.	12 17 5	12 40 0	9 17 47	14 10 30	7 46 52	16 40 43	6 33 40	17 53 55	5 25 44	19 1 51	0 0 0	24 0 0
80.	13 0 0	12 24 0	10 17 5	13 24 0	8 15 7	16 12 28	6 43 11	17 44 24	5 16 28	19 11 7	0 0 0	24 0 0
82.	13 43 0	12 0 0	11 0 0	12 0 0	9 6 43	15 20 52	6 43 11	17 44 24	4 59 53	19 27 42	0 0 0	24 0 0
84.	14 24 0	11 44 0	11 43 0	11 44 0	9 6 43	15 20 52	6 43 11	17 44 24	4 59 53	19 27 42	0 0 0	24 0 0
86.	15 0 0	11 24 0	12 0 0	11 24 0	9 6 43	15 20 52	6 43 11	17 44 24	4 59 53	19 27 42	0 0 0	24 0 0
88.	15 43 0	11 0 0	12 43 0	11 0 0	9 6 43	15 20 52	6 43 11	17 44 24	4 59 53	19 27 42	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = 0.		1CC.		2CC.		3CC.		4CC.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	6 10 58	18 17 49	5 39 47	18 49 0	5 20 47	19 14 0	5 7 14	19 21 33	4 56 15	19 32 32	4 12 7	20 16 40
2.	6 12 48	18 15 59	5 41 36	18 47 11	5 22 37	19 6 10	5 9 6	19 19 41	4 58 8	19 30 39	4 14 8	20 14 39
4.	6 14 37	18 14 10	5 43 23	18 45 24	5 24 24	19 4 23	5 10 52	19 17 55	4 59 54	19 28 53	4 16 0	20 12 47
6.	6 16 26	18 12 21	5 45 8	18 43 39	5 26 6	19 2 41	5 12 34	19 16 13	5 1 36	19 27 11	4 17 42	20 11 5
8.	6 18 17	18 10 30	5 46 50	18 41 57	5 27 46	19 1 1	5 14 11	19 14 36	5 3 11	19 25 35	4 19 14	20 9 33
10.	6 20 7	18 8 40	5 48 32	18 40 15	5 29 22	18 59 25	5 15 11	19 13 3	5 4 42	19 24 5	4 20 37	20 8 10
12.	6 22 0	18 6 47	5 50 11	18 38 36	5 30 53	18 57 52	5 17 13	19 11 34	5 5 6	19 22 39	4 21 51	20 6 56
14.	6 23 53	18 4 54	5 51 50	18 36 57	5 32 23	18 56 22	5 18 38	19 10 9	5 7 28	19 21 19	4 22 56	20 5 51
16.	6 25 48	18 2 59	5 53 27	18 35 20	5 33 53	18 54 54	5 19 59	19 8 48	5 8 44	19 20 3	4 23 52	20 4 55
18.	6 27 46	18 1 1	5 55 4	18 33 43	5 35 16	18 53 29	5 21 16	19 7 31	5 9 55	19 18 52	4 24 39	20 4 8
20.	6 29 46	17 59 1	5 56 41	18 32 6	5 36 4	18 52 6	5 22 30	19 6 17	5 11 1	19 17 46	4 25 16	20 3 31
22.	6 31 49	17 56 58	5 58 17	18 30 30	5 38 2	18 50 45	5 24 47	19 4 0	5 13 0	19 15 47	4 26 3	20 3 33
24.	6 33 55	17 54 52	5 59 52	18 28 55	5 39 20	18 49 27	5 26 50	19 1 1	5 14 0	19 14 7	4 26 11	20 2 36
26.	6 36 5	17 52 42	6 1 29	18 27 18	5 40 37	18 48 10	5 28 38	19 0 9	5 15 23	19 13 24	4 25 56	20 2 51
28.	6 38 19	17 50 28	6 3 5	18 25 42	5 41 52	18 46 55	5 27 46	19 1 1	5 16 32	19 12 15	4 25 31	20 3 16
30.	6 40 38	17 48 9	6 4 42	18 24 5	5 43 5	18 45 42	5 29 27	18 59 20	5 17 33	19 11 48	4 24 46	20 3 54
32.	6 43 3	17 45 44	6 6 21	18 22 26	5 44 17	18 43 31	5 30 13	18 58 34	5 18 59	19 11 14	4 24 1	20 4 16
34.	6 45 34	17 43 13	6 8 0	18 20 47	5 45 26	18 42 12	5 31 31	18 56 43	5 17 41	19 11 6	4 23 55	20 3 52
36.	6 48 13	17 40 34	6 11 25	18 19 6	5 46 35	18 40 0	5 32 4	18 56 43	5 17 40	19 11 7	4 23 48	20 3 57
38.	6 50 59	17 37 46	6 13 10	18 17 22	5 47 42	18 41 5	5 33 54	18 57 53	5 17 32	19 11 15	4 22 52	20 3 25
40.	6 53 55	17 34 52	6 14 59	18 15 37	5 48 47	18 40 0	5 35 18	18 55 52	5 17 14	19 11 33	4 22 30	20 3 17
42.	6 57 2	17 31 45	6 16 48	18 13 49	5 49 51	18 38 56	5 36 13	18 55 24	5 16 5	19 12 42	4 21 5	20 2 39
44.	7 0 21	17 28 26	6 18 26	18 11 55	5 50 54	18 37 53	5 37 22	18 55 37	5 15 11	19 13 36	4 20 28	20 2 21
46.	7 3 54	17 24 52	6 16 48	18 9 55	5 51 56	18 36 51	5 38 32	18 56 15	5 14 1	19 14 46	3 54 52	20 33 55
48.	7 7 44	17 21 34	6 20 50	18 7 57	5 52 56	18 35 51	5 39 32	18 55 35				

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	SCREEN	HEIGHT	DECLINATION OF SUN AT NOON	EQUATION OF TIME -C.21		1000.		400.		300.	
					1CC.	2CC.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	C	C	24	C	24	C	C	C	C	C	C	C
-86.	C	C	24	C	24	C	C	C	C	C	C	C
-84.	C	C	24	C	24	C	C	C	C	C	C	C
-82.	C	C	24	C	24	C	C	C	C	C	C	C
-80.	C	C	24	C	24	C	C	C	C	C	C	C
-78.	C	C	24	C	24	C	C	C	C	C	C	C
-76.	C	C	24	C	24	C	C	C	C	C	C	C
-74.	C	C	24	C	24	C	C	C	C	C	C	C
-72.	C	C	24	C	24	C	C	C	C	C	C	C
-70.	C	C	24	C	24	C	C	C	C	C	C	C
-68.	C	C	24	C	24	C	C	C	C	C	C	C
-66.	C	C	24	C	24	C	C	C	C	C	C	C
-64.	C	C	24	C	24	C	C	C	C	C	C	C
-62.	C	C	24	C	24	C	C	C	C	C	C	C
-60.	C	C	24	C	24	C	C	C	C	C	C	C
-58.	C	C	24	C	24	C	C	C	C	C	C	C
-56.	C	C	24	C	24	C	C	C	C	C	C	C
-54.	C	C	24	C	24	C	C	C	C	C	C	C
-52.	C	C	24	C	24	C	C	C	C	C	C	C
-50.	C	C	24	C	24	C	C	C	C	C	C	C
-48.	C	C	24	C	24	C	C	C	C	C	C	C
-46.	C	C	24	C	24	C	C	C	C	C	C	C
-44.	C	C	24	C	24	C	C	C	C	C	C	C
-42.	C	C	24	C	24	C	C	C	C	C	C	C
-40.	C	C	24	C	24	C	C	C	C	C	C	C
-38.	C	C	24	C	24	C	C	C	C	C	C	C
-36.	C	C	24	C	24	C	C	C	C	C	C	C
-34.	C	C	24	C	24	C	C	C	C	C	C	C
-32.	C	C	24	C	24	C	C	C	C	C	C	C
-30.	C	C	24	C	24	C	C	C	C	C	C	C
-28.	C	C	24	C	24	C	C	C	C	C	C	C
-26.	C	C	24	C	24	C	C	C	C	C	C	C
-24.	C	C	24	C	24	C	C	C	C	C	C	C
-22.	C	C	24	C	24	C	C	C	C	C	C	C
-20.	C	C	24	C	24	C	C	C	C	C	C	C
-18.	C	C	24	C	24	C	C	C	C	C	C	C
-16.	C	C	24	C	24	C	C	C	C	C	C	C
-14.	C	C	24	C	24	C	C	C	C	C	C	C
-12.	C	C	24	C	24	C	C	C	C	C	C	C
-10.	C	C	24	C	24	C	C	C	C	C	C	C
-8.	C	C	24	C	24	C	C	C	C	C	C	C
-6.	C	C	24	C	24	C	C	C	C	C	C	C
-4.	C	C	24	C	24	C	C	C	C	C	C	C
-2.	C	C	24	C	24	C	C	C	C	C	C	C

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.		1000.		400.		300.		200.		300.		400.		1000.	
		SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	6	5 14	18 15 57	5 38 32	18 46 39	5 19 51	19 5 20	5 6 32	19 18 39	5 6 32	19 18 39	5 6 32	19 18 39	4 55 45	19 29 26	4 12 28	20 12 43
2.	6	10 19	18 14 52	5 39 37	18 45 34	5 20 56	19 4 15	5 7 38	19 17 33	5 7 38	19 17 33	5 7 38	19 17 33	4 56 51	19 28 20	4 13 39	20 11 32
4.	6	11 24	18 12 47	5 40 39	18 44 32	5 21 58	19 3 13	5 8 39	19 16 32	5 8 39	19 16 32	5 8 39	19 16 32	4 57 51	19 27 20	4 14 40	20 10 31
6.	6	12 29	18 12 42	5 41 39	18 43 32	5 22 55	19 2 16	5 9 35	19 15 36	5 9 35	19 15 36	5 9 35	19 15 36	4 58 48	19 25 35	4 15 31	20 9 40
8.	6	13 35	18 11 36	5 42 37	18 42 34	5 23 49	19 1 22	5 10 26	19 14 45	5 10 26	19 14 45	5 10 26	19 14 45	4 59 35	19 25 36	4 16 13	20 8 58
10.	6	14 41	18 10 30	5 43 34	18 41 37	5 24 47	19 0 31	5 11 13	19 13 58	5 11 13	19 13 58	5 11 13	19 13 58	5 0 19	19 24 52	4 16 45	20 8 26
12.	6	15 47	18 9 24	5 44 28	18 40 43	5 25 27	18 59 44	5 11 55	19 13 16	5 11 55	19 13 16	5 11 55	19 13 16	5 0 57	19 24 14	4 17 18	20 8 3
14.	6	16 54	18 8 17	5 45 20	18 39 51	5 26 11	18 59 0	5 12 33	19 12 38	5 12 33	19 12 38	5 12 33	19 12 38	5 1 30	19 23 41	4 17 22	20 7 49
16.	6	18 2	18 7 9	5 46 11	18 39 0	5 26 51	18 58 20	5 13 6	19 12 5	5 13 6	19 12 5	5 13 6	19 12 5	5 1 58	19 23 13	4 17 26	20 7 45
18.	6	19 11	18 6 0	5 47 0	18 38 11	5 27 28	18 57 43	5 13 35	19 11 36	5 13 35	19 11 36	5 13 35	19 11 36	5 2 20	19 22 51	4 17 20	20 7 51
20.	5	20 22	18 4 49	5 47 47	18 37 24	5 28 2	18 57 9	5 13 59	19 10 38	5 13 59	19 10 38	5 13 59	19 10 38	5 2 36	19 22 35	4 17 22	20 7 55
22.	5	21 34	18 3 37	5 48 33	18 36 39	5 28 32	18 56 39	5 14 19	19 10 52	5 14 19	19 10 52	5 14 19	19 10 52	5 2 47	19 22 24	4 17 36	20 8 35
24.	5	22 48	18 2 23	5 49 18	18 35 53	5 29 0	18 56 11	5 14 33	19 10 38	5 14 33	19 10 38	5 14 33	19 10 38	5 2 51	19 22 20	4 15 57	20 9 14
26.	6	24 1	18 1 7	5 50 1	18 35 10	5 29 23	18 55 48	5 14 43	19 10 28	5 14 43	19 10 28	5 14 43	19 10 28	5 2 45	19 22 22	4 15 7	20 10 4
28.	6	25 22	17 59 49	5 50 43	18 34 28	5 29 43	18 55 28	5 14 47	19 10 24	5 14 47	19 10 24	5 14 47	19 10 24	5 2 41	19 22 30	4 14 4	20 11 7
30.	6	26 42	17 58 28	5 51 23	18 33 48	5 30 0	18 55 11	5 14 46	19 10 25	5 14 46	19 10 25	5 14 46	19 10 25	5 2 25	19 22 46	4 12 46	20 12 25
32.	6	28 8	17 57 3	5 52 3	18 33 8	5 30 12	18 54 59	5 14 39	19 10 32	5 14 39	19 10 32	5 14 39	19 10 32	5 2 2	19 23 9	4 11 15	20 13 56
34.	6	29 25	17 55 26	5 53 17	18 31 54	5 30 24	18 54 51	5 14 26	19 10 45	5 14 26	19 10 45	5 14 26	19 10 45	5 1 32	19 23 39	4 9 26	20 15 45
36.	6	31 7	17 54 4	5 53 53	18 31 18	5 30 23	18 54 48	5 13 39	19 11 32	5 13 39	19 11 32	5 13 39	19 11 32	5 0 52	19 24 19	4 7 20	20 17 51
38.	6	32 43	17 52 28	5 54 27	18 30 44	5 30 15	18 54 54	5 13 4	19 12 7	5 13 4	19 12 7	5 13 4	19 12 7	5 0 3	19 25 8	4 4 54	20 20 17
40.	6	34 24	17 49 0	5 55 0	18 30 11	5 30 5	18 55 6	5 12 20	19 12 51	5 12 20	19 12 51	5 12 20	19 12 51	4 59 3	19 26 8	4 2 6	20 23 5
42.	6	36 11	17 45 4	5 55 32	18 29 39	5 29 48	18 55 23	5 11 26	19 13 45	5 11 26	19 13 45	5 11 26	19 13 45	4 56 29	19 28 42	3 58 53	20 26 18
44.	6	38 7	17 41 6	5 56 2	18 29 9	5 29 23	18 55 48	5 10 21	19 14 50	5 10 21	19 14 50	5 10 21	19 14 50	4 54 50	19 30 21	3 55 11	20 30 0
46.	6	42 17	17 42 54	5 56 31	18 28 40	5 28 51	18 56 20	5 9 4	19 16 7	5 9 4	19 16 7	5 9 4	19 16 7	4 52 56	19 32 15	3 46 2	20 34 15
48.	6	44 38	17 40 33	5 56 58	18 28 13	5 28 10	18 57 1	5 7 33	19 17 38	5 7 33	19 17 38	5 7 33	19 17 38	4 50 42	19 34 29	3 40 23	20 44 48
50.	6	47 11	17 38 0	5 57 23	18 27 48	5 27 19	18 57 52	5 5 46	19 19 25	5 5 46	19 19 25	5 5 46	19 19 25	4 48 7	19 37 4	3 33 49	20 51 22
52.	6	49 58	17 35 13	5 57 47	18 27 24	5 26 16	18 58 55	5 3 40	19 21 31	5 3 40	19 21 31	5 3 40	19 21 31	4 45 6	19 40 5	3 26 8	20 59 3
54.	6	53 2	17 32 9	5 58 9	18 27 2	5 25 1	19 0 10	5 1 11	19 24 0	5 1 11	19 24 0	5 1 11	19 24 0	4 41 30	19 43 35	3 17 4	21 8 7
56.	6	56 25	17 28 46	5 58 26	18 26 43	5 23 29	19 1 42	4 58 17	19 26 54	4 58 17	19 26 54	4 58 17	19 26 54	4 37 29	19 47 42	3 6 11	21 19 0
58.	7	0 14	17 24 57	5 58 45	18 26 26	5 21 39	19 3 32	4 54 51	19 30 20	4 54 51	19 30 20	4 54 51	19 30 20	4 32 39	19 52 32	2 52 54	21 32 17
60.	7	4 22	17 20 39	5 58 58	18 26 13	5 19 26	19 5 45	4 50 46	19 34 25	4 50 46	19 34 25	4 50 46	19 34 25	4 26 54	19 58 17	2 36 12	21 48 59
62.	7	9 27	17 15 44	5 59 8	18 26 3	5 16 45	19 8 26	4 45 53	19 39 18	4 45 53	19 39 18	4 45 53	19 39 18	4 20 2	20 5 9	2 14 10	22 11 1
64.	7	15 9	17 10 2	5 59 13	18 25 58	5 13 28	19 11 43	4 40 0	19 45 11	4 40 0	19 45 11	4 40 0	19 45 11	4 11 42	20 13 29	1 42 5	22 43 6
66.	7	21 51	17 3 20	5 59 12	18 25 59	5 9 27	19 15 44	4 32 46	19 52 25	4 32 46	19 52 25	4 32 46	19 52 25	4 1 26	20 23 45	0 22 26	0 2 45
68.	7	29 54	16 55 17	5 59 4	18 26 7	5 4 27	19 20 44	4 23 47	20 1 24	4 23 47	20 1 24	4 23 47	20 1 24	3 48 28	20 36 43	0 0 0	24 0 0
70.	7	39 47	16 45 24	5 58 46	18 26 25	4 58 7	19 27 4	4 12 21	20 12 50	4 12 21	20 12 50	4 12 21	20 12 50	3 31 38	20 53 33	0 0 0	24 0 0
72.	7	52 16	16 32 55	5 58 15	18 26 56	4 49 56	19 35 15	3 57 19	20 27 52	3 57 19	20 27 52	3 57 19	20 27 52	3 26 38	21 16 33	0 0 0	24 0 0
74.	8	8 41	16 16 30	5 57 25	18 27 46	4 39 3	19 46 9	3 36 41	20 48 30	3 36 41	20 48 30	3 36 41	20 48 30	3 8 38	21 50 41	0 0 0	24 0 0
76.	8	31 29	15 52 42	5 54 7	18 29 4	4 23 53	20 1 18	3 6 8	21 19 3	3 6 8	21 19 3	3 6 8	21 19 3	1 30 46	22 54 25	0 0 0	24 0 0
78.	9	6 14	15 15 57	5 54 3	18 31 8	4 1 24	20 23 47	2 13 6	22 12 5	2 13 6	22 12 5	2 13 6	22 12 5	0 0 0	24 0 0	0 0 0	24 0 0
80.	10	11 16	14 14 4	5 50 41	18 34 30	3 24 11	21 1 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	10	0 0	14 0 0	5 44 40	18 40 31	2 2 33	22 22 38	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	10	0 0	14 0 0	5 34 0	18 53 11	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	10	0 0	14 0 0	4 51 54	19 33 17	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES -- Continued

[illegible]

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 35 13	18 42 46	5 16 42	19 1 17	5 3 30	19 14 29	4 52 48	19 25 11	4 9 58	20 8 1		
2.	5 35 32	18 42 27	5 17 0	19 0 59	5 3 48	19 14 11	4 53 6	19 24 53	4 10 16	20 7 43		
4.	5 35 47	18 42 12	5 17 14	19 0 45	5 4 1	19 13 58	4 53 18	19 24 41	4 10 24	20 7 35		
6.	5 36 1	18 41 58	5 17 24	19 0 35	5 4 9	19 13 50	4 53 24	19 24 35	4 10 22	20 7 37		
8.	5 36 12	18 41 47	5 17 31	19 0 28	5 4 12	19 13 47	4 53 24	19 24 35	4 10 11	20 7 48		
10.	5 36 21	18 41 38	5 17 33	19 0 26	5 4 10	19 13 49	4 53 19	19 24 40	4 9 50	20 8 9		
12.	5 36 27	18 41 32	5 17 32	19 0 27	5 4 3	19 13 56	4 53 7	19 24 52	4 9 18	20 8 41		
14.	5 36 31	18 41 28	5 17 26	19 0 33	5 3 51	19 14 8	4 52 49	19 25 10	4 8 37	20 9 22		
16.	5 36 32	18 41 27	5 17 17	19 0 42	5 3 33	19 14 26	4 52 25	19 25 34	4 7 44	20 10 15		
18.	5 36 30	18 41 29	5 17 3	19 0 56	5 3 10	19 14 49	4 51 55	19 26 4	4 6 41	20 11 18		
20.	5 36 26	18 41 33	5 16 44	19 1 15	5 2 41	19 15 18	4 51 17	19 26 42	4 5 25	20 12 34		
22.	5 36 19	18 41 40	5 16 21	19 1 38	5 2 7	19 15 52	4 50 32	19 27 27	4 3 56	20 14 3		
24.	5 36 10	18 41 49	5 15 53	19 2 6	5 1 25	19 16 34	4 49 40	19 28 19	4 2 14	20 15 45		
26.	5 35 57	18 42 2	5 15 20	19 2 39	5 0 37	19 17 22	4 48 39	19 29 20	4 0 18	20 17 41		
28.	5 35 41	18 42 18	5 14 41	19 3 18	4 59 42	19 18 17	4 47 30	19 30 29	3 58 5	20 19 54		
30.	5 35 21	18 42 38	5 13 57	19 4 2	4 56 38	19 19 21	4 46 11	19 31 48	3 55 35	20 22 24		
32.	5 34 58	18 43 1	5 13 5	19 4 54	4 57 26	19 20 33	4 44 41	19 33 18	3 52 46	20 25 13		
34.	5 34 31	18 43 28	5 12 7	19 5 52	4 56 5	19 21 54	4 43 1	19 34 58	3 49 36	20 28 23		
36.	5 33 59	18 44 C	5 11 1	19 6 58	4 54 33	19 23 26	4 41 8	19 36 51	3 46 1	20 31 58		
38.	5 33 22	18 44 37	5 9 46	19 8 13	4 52 51	19 25 8	4 39 1	19 38 58	3 42 0	20 35 59		
40.	5 32 40	18 45 19	5 8 22	19 9 37	4 50 55	19 27 4	4 36 38	19 41 21	3 37 28	20 40 31		
42.	5 31 52	18 46 7	5 6 48	19 11 11	4 48 46	19 29 13	4 33 59	19 44 0	3 32 21	20 45 38		
44.	5 30 58	18 47 1	5 5 2	19 12 57	4 46 20	19 31 39	4 30 59	19 47 0	3 26 32	20 51 27		
46.	5 29 56	18 48 3	5 3 2	19 14 57	4 43 37	19 34 22	4 27 38	19 50 21	3 19 54	20 58 5		
48.	5 28 46	18 49 13	5 0 47	19 17 12	4 40 32	19 37 27	4 23 50	19 54 9	3 12 17	21 5 42		
50.	5 27 26	18 50 33	4 58 15	19 19 44	4 37 4	19 40 55	4 19 33	19 58 26	3 3 27	21 14 32		
52.	5 25 55	18 52 4	4 55 22	19 22 37	4 33 8	19 44 51	4 14 40	20 3 19	2 53 5	21 24 54		
54.	5 24 11	18 53 48	4 52 5	19 25 54	4 28 38	19 49 21	4 9 5	20 8 54	2 40 42	21 37 17		
56.	5 22 12	18 55 47	4 48 20	19 29 39	4 23 29	19 54 30	4 2 39	20 15 20	2 25 32	21 52 27		
58.	5 19 55	18 58 4	4 44 2	19 33 57	4 17 33	20 0 26	3 55 11	20 22 48	2 6 14	22 11 45		
60.	5 17 16	19 0 43	4 39 2	19 38 57	4 10 37	20 7 22	3 46 24	20 31 35	1 39 42	22 38 17		
62.	5 14 11	19 3 48	4 33 12	19 44 47	4 2 27	20 15 32	3 35 57	20 42 2	0 0 0	23 24 31		
64.	5 10 34	19 7 25	4 26 17	19 51 42	3 52 42	20 25 17	3 23 17	20 54 42	0 0 0	24 0 0		
66.	5 6 15	19 11 44	4 18 1	19 59 58	3 40 50	20 37 9	3 7 30	21 10 29	0 0 0	24 0 0		
68.	5 1 4	19 16 55	4 7 57	20 10 2	3 26 3	20 51 56	2 47 8	21 30 51	0 0 0	24 0 0		
70.	4 54 43	19 23 16	3 55 23	20 22 36	3 6 59	21 11 0	2 19 3	21 58 56	0 0 0	24 0 0		
72.	4 46 49	19 31 10	3 35 16	20 38 43	2 41 1	21 36 58	1 34 7	22 43 52	0 0 0	24 0 0		
74.	4 36 41	19 41 18	3 17 39	21 0 20	2 1 31	22 16 28	0 0 0	24 0 0	0 0 0	24 0 0		
76.	4 23 17	19 54 42	2 46 27	21 31 32	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0		
78.	4 4 39	20 13 20	1 53 22	22 24 37	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0		
80.	2 36 42	20 41 17	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0		
82.	2 48 22	21 29 37	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0		
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0		
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0		
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0		

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	63	4	1	DECLINATION OF SUN AT NOON	4.37	EQUATION OF TIME -C.07	300.	400.	1000.
LAT	SUNRISE	HEIGHT = 0.	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-86.	10 12 26	24	0 0	0 0	0 0	0 0	0 0	0 0	0 0
-86.	10 12 26	24	0 0	0 0	0 0	0 0	0 0	0 0	0 0
-84.	8 23 5	15	40 16	0 0	0 0	0 0	0 0	0 0	0 0
-82.	7 48 19	16	40 4	0 0	0 0	0 0	0 0	0 0	0 0
-80.	7 22 59	16	40 4	0 0	0 0	0 0	0 0	0 0	0 0
-78.	7 11 28	16	56 55	4 43	42	19 25 41	24	0 0	0 0
-76.	7 11 28	16	56 55	4 43	42	19 25 41	24	0 0	0 0
-74.	6 53 31	17	14 52	3 27 52	20 40 31	2 14 45	22 53 38	0 0	0 0
-72.	6 47 32	17	20 51	3 27 52	20 40 31	2 14 45	22 53 38	0 0	0 0
-70.	6 42 43	17	25 38	4 16 31	19 51 52	3 32 8	20 36 15	0 0	0 0
-68.	6 38 43	17	25 38	4 25 53	19 42 30	3 46 37	20 21 46	0 0	0 0
-66.	6 32 33	17	32 59	4 33 28	19 34 55	3 58 7	20 10 16	0 0	0 0
-64.	6 32 33	17	32 59	4 33 28	19 34 55	3 58 7	20 10 16	0 0	0 0
-62.	6 27 33	17	38 19	4 44 54	19 23 29	4 15 11	19 53 12	1 36 35	22 31 48
-60.	6 25 57	17	42 26	4 45 18	19 19 5	4 21 42	19 46 43	2 22 39	21 45 44
-58.	6 24 12	17	44 11	4 53 3	19 15 20	4 27 11	19 41 12	2 51 10	21 17 13
-56.	6 22 38	17	47 45	4 56 16	19 12 7	4 31 55	19 36 28	3 11 38	20 56 45
-54.	6 21 12	17	47 11	5 1 27	19 9 20	4 36 0	19 32 23	3 27 18	20 41 5
-52.	6 19 53	17	48 30	5 3 33	19 4 51	4 42 39	19 25 44	3 39 46	20 28 37
-50.	6 18 39	17	45 44	5 5 22	19 3 1	4 45 21	19 23 2	3 49 57	20 18 26
-48.	6 17 31	17	50 52	5 6 57	19 1 26	4 47 44	19 20 39	3 58 25	20 9 58
-46.	6 16 28	17	51 55	5 8 20	19 0 3	4 49 49	19 18 34	3 58 25	20 9 58
-44.	6 15 38	17	52 53	5 9 32	18 58 51	4 51 39	19 16 44	3 58 25	20 9 58
-42.	6 14 32	17	53 51	5 10 35	18 57 48	4 53 15	19 15 8	3 58 25	20 9 58
-40.	6 13 36	17	54 45	5 11 29	18 56 54	4 55 54	19 12 29	3 58 25	20 9 58
-38.	6 12 47	17	55 36	5 12 16	18 56 7	4 56 58	19 11 25	3 58 25	20 9 58
-36.	6 11 58	17	56 25	5 13 55	18 54 55	4 57 53	19 10 30	3 58 25	20 9 58
-34.	6 11 27	17	57 11	5 14 33	18 54 28	4 59 19	19 9 43	3 58 25	20 9 58
-32.	6 10 43	17	58 40	5 14 33	18 53 50	4 59 52	19 8 31	3 58 25	20 9 58
-30.	6 9 59	17	59 22	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-28.	6 8 20	18	0 43	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-26.	6 7 40	18	0 43	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-24.	6 6 54	18	1 22	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-22.	6 6 22	18	2 35	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-20.	6 5 44	18	3 43	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-18.	6 4 59	18	4 50	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-16.	6 4 11	18	6 0	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-14.	6 3 23	18	7 18	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-12.	6 2 37	18	8 43	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-10.	6 1 53	18	9 59	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-8.	6 1 10	18	11 16	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-6.	6 0 28	18	12 44	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-4.	6 0 48	18	14 18	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58
-2.	6 0 11	18	15 57	5 14 33	18 53 31	5 0 38	19 7 45	3 58 25	20 9 58

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = 0.	1000.		400.		300.		200.		100.		0.	
			SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	6	C 51	18 7 32	18 38 2	5 30 21	18 38 2	5 11 47	18 56 36	5 11 47	18 56 36	5 11 47	18 56 36	5 11 47	18 56 36
2.	6	C 14	18 8 9	18 38 40	5 29 43	18 38 40	5 11 6	18 57 15	5 11 6	18 57 15	5 11 6	18 57 15	5 11 6	18 57 15
4.	5	59 37	18 8 46	18 39 21	5 29 2	18 39 21	5 10 24	18 57 57	5 10 24	18 57 57	5 10 24	18 57 57	5 10 24	18 57 57
6.	5	58 59	18 9 24	18 40 5	5 28 18	18 40 5	5 9 36	18 58 47	5 9 36	18 58 47	5 9 36	18 58 47	5 9 36	18 58 47
8.	5	58 21	18 10 2	18 40 52	5 27 31	18 40 52	5 8 44	18 59 39	5 8 44	18 59 39	5 8 44	18 59 39	5 8 44	18 59 39
10.	5	57 43	18 10 40	18 41 41	5 26 42	18 41 41	5 7 47	19 0 36	5 7 47	19 0 36	5 7 47	19 0 36	5 7 47	19 0 36
12.	5	57 3	18 11 20	18 42 34	5 25 49	18 42 34	5 6 46	19 1 37	5 6 46	19 1 37	5 6 46	19 1 37	5 6 46	19 1 37
14.	5	56 23	18 12 0	18 43 30	5 24 53	18 43 30	5 5 39	19 2 44	5 5 39	19 2 44	5 5 39	19 2 44	5 5 39	19 2 44
16.	5	55 41	18 12 42	18 44 30	5 23 53	18 44 30	5 4 27	19 3 56	5 4 27	19 3 56	5 4 27	19 3 56	5 4 27	19 3 56
18.	5	54 59	18 13 24	18 45 34	5 22 49	18 45 34	5 3 10	19 5 13	5 3 10	19 5 13	5 3 10	19 5 13	5 3 10	19 5 13
20.	5	54 13	18 14 8	18 46 42	5 21 41	18 46 42	5 1 46	19 6 37	5 1 46	19 6 37	5 1 46	19 6 37	5 1 46	19 6 37
22.	5	53 30	18 14 53	18 47 54	5 20 29	18 47 54	5 0 16	19 7 8	5 0 16	19 7 8	5 0 16	19 7 8	5 0 16	19 7 8
24.	5	52 44	18 15 35	18 49 11	5 19 12	18 49 11	4 59 38	19 9 45	4 59 38	19 9 45	4 59 38	19 9 45	4 59 38	19 9 45
26.	5	51 56	18 16 27	18 50 34	5 17 45	18 50 34	4 55 53	19 11 30	4 55 53	19 11 30	4 55 53	19 11 30	4 55 53	19 11 30
28.	5	51 5	18 17 18	18 52 2	5 16 21	18 52 2	4 55 0	19 13 23	4 55 0	19 13 23	4 55 0	19 13 23	4 55 0	19 13 23
30.	5	50 13	18 18 10	18 53 37	5 14 46	18 53 37	4 52 57	19 15 26	4 52 57	19 15 26	4 52 57	19 15 26	4 52 57	19 15 26
32.	5	49 18	18 19 5	18 55 19	5 13 4	18 55 19	4 50 44	19 17 39	4 50 44	19 17 39	4 50 44	19 17 39	4 50 44	19 17 39
34.	5	48 20	18 20 3	18 57 9	5 11 14	18 57 9	4 48 20	19 20 3	4 48 20	19 20 3	4 48 20	19 20 3	4 48 20	19 20 3
36.	5	47 19	18 21 4	18 59 7	5 9 16	18 59 7	4 45 44	19 22 39	4 45 44	19 22 39	4 45 44	19 22 39	4 45 44	19 22 39
38.	5	46 15	18 22 8	19 1 15	5 7 8	19 1 15	4 42 53	19 25 30	4 42 53	19 25 30	4 42 53	19 25 30	4 42 53	19 25 30
40.	5	45 16	18 23 16	19 3 34	5 4 49	19 3 34	4 39 47	19 28 36	4 39 47	19 28 36	4 39 47	19 28 36	4 39 47	19 28 36
42.	5	44 34	18 24 29	19 6 5	5 2 18	19 6 5	4 36 23	19 32 0	4 36 23	19 32 0	4 36 23	19 32 0	4 36 23	19 32 0
44.	5	43 26	18 25 47	19 8 50	4 59 33	19 8 50	4 32 39	19 35 44	4 32 39	19 35 44	4 32 39	19 35 44	4 32 39	19 35 44
46.	5	42 12	18 27 11	19 11 51	4 56 32	19 11 51	4 28 31	19 39 52	4 28 31	19 39 52	4 28 31	19 39 52	4 28 31	19 39 52
48.	5	40 42	18 28 41	19 15 10	4 53 13	19 15 10	4 23 56	19 44 27	4 23 56	19 44 27	4 23 56	19 44 27	4 23 56	19 44 27
50.	5	38 4	18 30 19	19 18 50	4 49 33	19 18 50	4 18 50	19 49 33	4 18 50	19 49 33	4 18 50	19 49 33	4 18 50	19 49 33
52.	5	36 17	18 32 6	19 22 55	4 45 28	19 22 55	4 13 6	19 55 17	4 13 6	19 55 17	4 13 6	19 55 17	4 13 6	19 55 17
54.	5	34 19	18 34 4	19 27 29	4 40 54	19 27 29	4 6 37	20 1 46	4 6 37	20 1 46	4 6 37	20 1 46	4 6 37	20 1 46
56.	5	32 9	18 36 14	19 32 38	4 35 45	19 32 38	3 59 14	20 9 9	3 59 14	20 9 9	3 59 14	20 9 9	3 59 14	20 9 9
58.	5	29 44	18 38 39	19 38 29	4 29 54	19 38 29	3 50 43	20 17 40	3 50 43	20 17 40	3 50 43	20 17 40	3 50 43	20 17 40
60.	5	27 1	18 41 22	19 45 12	4 23 11	19 45 12	3 40 47	20 27 36	3 40 47	20 27 36	3 40 47	20 27 36	3 40 47	20 27 36
62.	5	23 56	18 44 27	19 52 59	4 15 24	19 52 59	3 29 1	20 39 22	3 29 1	20 39 22	3 29 1	20 39 22	3 29 1	20 39 22
64.	5	20 18	18 47 59	20 2 9	4 6 14	20 2 9	3 14 46	21 53 37	3 14 46	21 53 37	3 14 46	21 53 37	3 14 46	21 53 37
66.	5	16 18	18 52 5	20 13 7	3 55 16	20 13 7	2 57 1	21 11 22	2 57 1	21 11 22	2 57 1	21 11 22	2 57 1	21 11 22
68.	5	11 28	18 56 55	20 26 31	3 41 52	20 26 31	2 33 53	21 34 30	2 33 53	21 34 30	2 33 53	21 34 30	2 33 53	21 34 30
70.	5	5 40	19 2 43	20 32 23	3 25 0	20 32 23	2 1 7	22 7 16	2 1 7	22 7 16	2 1 7	22 7 16	2 1 7	22 7 16
72.	4	56 35	19 5 48	21 5 33	3 2 50	21 5 33	1 0 0	24 0 0	1 0 0	24 0 0	1 0 0	24 0 0	1 0 0	24 0 0
74.	4	49 41	19 18 42	21 36 49	2 31 35	21 36 49	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	4	38 8	19 30 13	22 28 47	1 39 36	22 28 47	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	4	28 25	19 45 58	23 24 0	1 0 0	23 24 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	3	55 35	20 8 48	24 45 53	0 0 0	24 45 53	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	3	2 30	20 22 4	25 24 0	0 0 0	25 24 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	2	4 2	20 24 0	26 24 0	0 0 0	26 24 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0	0 0	20 24 0	27 24 0	0 0 0	27 24 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0	0 0	20 24 0	28 24 0	0 0 0	28 24 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	63	4	5	SCREEN HEIGHT = C.	DECLINATION OF SUN AT NOON	9.00	EQUATION OF TIME -C.01	200. 30.	SUNRISE	SUNSET	1000. 30.	SUNRISE	SUNSET	
LAT	SUNRISE	SUNSET	1000. 30.	SUNRISE	SUNSET	1000. 30.	SUNRISE	SUNSET	1000. 30.	SUNRISE	SUNSET	1000. 30.	SUNRISE	SUNSET
-88.	8 23 43	15 37 28	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-86.	7 7 36	16 53 35	2 1 17	21 59 54	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-84.	6 43 48	17 17 23	3 38 15	20 22 56	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-82.	6 31 46	17 29 25	4 15 36	19 45 35	2 8 47	21 52 24	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-80.	6 24 19	17 36 52	4 36 14	19 24 57	3 7 45	20 53 26	2 30 22	22 43 37	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-78.	6 19 19	17 42 22	4 49 22	19 11 51	3 39 33	20 21 38	2 30 22	21 30 49	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-76.	6 15 17	17 48 54	4 58 19	19 2 52	4 0 10	20 1	3 6 45	20 54 26	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-74.	6 12 12	17 48 59	5 4 47	18 56 24	4 14 41	19 46 30	3 30 27	20 30 44	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-72.	6 9 40	17 51 31	5 9 36	18 51 35	4 25 28	19 35 43	3 47 23	20 13 48	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-70.	6 7 30	17 53 41	5 13 16	18 47 55	4 33 44	19 27 27	4 0 8	20 1 3	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-68.	6 5 36	17 55 35	5 16 7	18 45 4	4 40 15	19 20 56	4 10 5	19 51 6	1 30 49	22 30 22	0 0 0	0 0 0	0 0 0	0 0 0
-66.	6 3 54	17 57 17	5 18 21	18 42 50	4 45 27	19 15 44	4 18 1	19 43 10	2 5 1	21 56 10	0 0 0	0 0 0	0 0 0	0 0 0
-64.	6 2 22	17 58 49	5 20 6	18 41 5	4 49 41	19 11 30	4 24 28	19 36 43	2 28 1	21 33 10	0 0 0	0 0 0	0 0 0	0 0 0
-62.	6 0 56	18 0 15	5 21 29	18 39 42	4 53 9	19 8 2	4 29 46	19 31 25	2 45 14	21 15 57	0 0 0	0 0 0	0 0 0	0 0 0
-60.	5 59 36	18 1 35	5 22 33	18 38 38	4 56 1	19 5 10	4 34 11	19 27 0	2 58 48	21 2 23	0 0 0	0 0 0	0 0 0	0 0 0
-58.	5 58 20	18 2 52	5 23 23	18 37 48	4 58 24	19 2 47	4 37 53	19 23 18	3 9 48	20 51 23	0 0 0	0 0 0	0 0 0	0 0 0
-56.	5 57 8	18 4 3	5 24 1	18 37 10	5 0 22	19 0 49	4 41 0	19 20 11	3 18 55	20 42 16	0 0 0	0 0 0	0 0 0	0 0 0
-54.	5 55 59	18 5 12	5 24 28	18 36 43	5 1 59	18 59 12	4 43 37	19 17 34	3 26 34	20 34 37	0 0 0	0 0 0	0 0 0	0 0 0
-52.	5 54 52	18 6 15	5 24 47	18 36 24	5 3 20	18 57 51	4 45 50	19 15 21	3 33 3	20 28 8	0 0 0	0 0 0	0 0 0	0 0 0
-50.	5 53 47	18 7 24	5 24 58	18 36 13	5 4 26	18 56 45	4 47 42	19 13 29	3 38 36	20 22 35	0 0 0	0 0 0	0 0 0	0 0 0
-48.	5 52 43	18 8 28	5 25 2	18 36 9	5 5 19	18 55 52	4 49 16	19 11 55	3 43 22	20 17 49	0 0 0	0 0 0	0 0 0	0 0 0
-46.	5 51 41	18 9 30	5 25 0	18 36 11	5 6 1	18 55 10	4 51 40	19 9 31	3 51 2	20 10 9	0 0 0	0 0 0	0 0 0	0 0 0
-44.	5 50 39	18 10 32	5 24 53	18 36 18	5 6 33	18 54 38	4 52 33	19 8 38	3 54 6	20 7 5	0 0 0	0 0 0	0 0 0	0 0 0
-42.	5 49 38	18 11 33	5 24 41	18 36 30	5 6 57	18 54 14	4 53 15	19 7 56	4 0 57	20 0 14	0 0 0	0 0 0	0 0 0	0 0 0
-40.	5 48 38	18 12 35	5 24 25	18 36 46	5 7 13	18 53 58	4 54 10	19 7 24	4 2 35	19 58 36	0 0 0	0 0 0	0 0 0	0 0 0
-38.	5 47 38	18 13 33	5 24 5	18 37 6	5 7 21	18 53 50	4 53 47	19 7 24	4 3 57	19 57 14	0 0 0	0 0 0	0 0 0	0 0 0
-36.	5 46 38	18 14 33	5 23 41	18 37 30	5 7 19	18 53 48	4 54 26	19 6 45	4 5 57	19 55 14	0 0 0	0 0 0	0 0 0	0 0 0
-34.	5 45 37	18 15 34	5 23 14	18 38 28	5 7 10	18 54 16	4 54 33	19 6 38	4 6 38	19 54 33	0 0 0	0 0 0	0 0 0	0 0 0
-32.	5 44 37	18 16 34	5 22 43	18 38 28	5 7 2	18 54 1	4 54 34	19 6 37	4 7 24	19 54 4	0 0 0	0 0 0	0 0 0	0 0 0
-30.	5 43 36	18 17 35	5 22 9	18 39 2	5 6 55	18 54 36	4 54 28	19 6 43	4 7 31	19 53 47	0 0 0	0 0 0	0 0 0	0 0 0
-28.	5 42 35	18 18 36	5 21 32	18 39 39	5 6 35	18 54 16	4 54 16	19 6 55	4 7 28	19 53 43	0 0 0	0 0 0	0 0 0	0 0 0
-26.	5 41 33	18 19 38	5 20 52	18 40 19	5 6 10	18 55 1	4 54 16	19 7 13	4 7 24	19 53 40	0 0 0	0 0 0	0 0 0	0 0 0
-24.	5 40 31	18 20 40	5 20 9	18 41 2	5 5 41	18 55 30	4 53 58	19 7 37	4 7 24	19 53 47	0 0 0	0 0 0	0 0 0	0 0 0
-22.	5 39 28	18 21 43	5 19 23	18 41 48	5 5 7	18 56 4	4 53 5	19 8 6	4 7 31	19 53 40	0 0 0	0 0 0	0 0 0	0 0 0
-20.	5 38 23	18 22 47	5 18 34	18 42 37	5 4 29	18 56 42	4 53 1	19 8 40	4 7 28	19 53 43	0 0 0	0 0 0	0 0 0	0 0 0
-18.	5 37 18	18 23 53	5 17 43	18 43 28	5 3 3	18 58 10	4 52 31	19 9 20	4 7 24	19 53 57	0 0 0	0 0 0	0 0 0	0 0 0
-16.	5 36 12	18 24 59	5 16 48	18 44 23	5 2 10	18 59 56	4 51 51	19 10 5	4 6 52	19 54 19	0 0 0	0 0 0	0 0 0	0 0 0
-14.	5 35 5	18 26 7	5 15 50	18 45 21	5 1 15	19 0 55	4 50 15	19 10 56	4 6 19	19 54 52	0 0 0	0 0 0	0 0 0	0 0 0
-12.	5 34 33	18 27 16	5 14 50	18 46 21	5 0 16	19 1 59	4 49 20	19 11 51	4 6 19	19 55 33	0 0 0	0 0 0	0 0 0	0 0 0
-10.	5 33 55	18 28 27	5 13 46	18 47 25	4 59 12	19 1 59	4 48 19	19 12 52	4 4 47	19 56 24	0 0 0	0 0 0	0 0 0	0 0 0
-8.	5 32 44	18 29 39	5 12 39	18 48 32	4 58 4	19 3 7	4 47 13	19 13 58	4 3 46	19 57 25	0 0 0	0 0 0	0 0 0	0 0 0
-6.	5 31 32	18 30 53	5 11 28	18 49 43	4 56 52	19 4 19	4 46 1	19 15 10	4 2 37	19 58 34	0 0 0	0 0 0	0 0 0	0 0 0
-4.	5 30 18	18 32 10	5 10 14	18 50 57	4 55 34	19 5 37	4 44 4	19 16 27	4 1 18	19 59 53	0 0 0	0 0 0	0 0 0	0 0 0
-2.	5 29 5	18 33 28	5 8 57	18 52 14	4 54 5	19 6 6	4 43 1	19 17 44	4 0 5	19 60 2	0 0 0	0 0 0	0 0 0	0 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN HEIGHT = C. SUNRISE	SUNSET	1000. 30.		2000. 30.		3000. 30.		4000. 30.		5000. 30.	
			SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5 57 13	18 5 58	5 26 22	18 34 49	5 7 35	18 53 36	4 54 12	19 6 59	4 43 21	19 17 50	3 59 49	20 1 22
2.	5 55 51	18 5 20	5 24 58	18 36 13	5 6 10	18 55 1	4 52 45	19 8 26	4 41 52	19 19 19	3 58 9	20 3 2
4.	5 54 29	18 5 42	5 23 32	18 37 39	5 4 40	18 56 31	4 51 12	19 9 59	4 40 16	19 20 55	3 56 20	20 4 51
6.	5 53 7	18 5 4	5 22 3	18 39 8	5 3 5	18 58 6	4 49 33	19 1 38	4 38 34	19 22 37	3 54 19	20 6 52
8.	5 51 43	18 5 28	5 20 30	18 40 41	5 1 26	18 59 45	4 47 49	19 13 22	4 36 45	19 24 26	3 52 7	20 9 4
10.	5 50 19	18 10 52	5 18 54	18 42 17	4 59 41	19 1 30	4 45 58	19 15 13	4 34 48	19 26 23	3 49 42	20 11 29
12.	5 48 53	18 12 18	5 17 13	18 43 58	4 57 51	19 3 20	4 44 0	19 17 11	4 32 43	19 28 28	3 47 5	20 14 6
14.	5 47 26	18 13 45	5 15 29	18 45 42	4 55 55	19 5 16	4 41 55	19 19 16	4 30 30	19 30 41	3 44 13	20 16 58
16.	5 45 56	18 15 15	5 13 40	18 47 31	4 53 52	19 7 19	4 39 41	19 21 30	4 28 8	19 33 3	3 41 6	20 20 5
18.	5 44 25	18 16 46	5 11 46	18 49 25	4 51 43	19 9 28	4 37 20	19 23 51	4 25 30	19 35 35	3 37 42	20 23 29
20.	5 42 51	18 18 20	5 9 46	18 51 25	4 49 25	19 11 46	4 34 49	19 26 22	4 22 53	19 38 18	3 34 1	20 27 10
22.	5 41 15	18 19 56	5 7 40	18 53 31	4 47 0	19 14 11	4 32 8	19 29 3	4 19 58	19 41 13	3 29 59	20 31 12
24.	5 39 35	18 21 36	5 5 27	18 55 44	4 44 25	19 16 46	4 29 15	19 31 56	4 16 51	19 44 20	3 25 35	20 35 36
26.	5 37 52	18 23 19	5 3 8	18 58 3	4 41 40	19 19 31	4 26 11	19 35 0	4 13 29	19 47 42	3 20 47	20 40 24
28.	5 36 5	18 25 6	5 0 39	19 0 32	4 38 44	19 22 27	4 22 53	19 38 18	4 9 52	19 51 19	3 15 30	20 45 41
30.	5 34 14	18 26 57	4 58 2	19 3 9	4 35 35	19 25 36	4 19 20	19 41 51	4 5 57	19 55 14	3 9 41	20 51 30
32.	5 32 17	18 28 54	4 55 15	19 5 56	4 32 13	19 28 58	4 15 30	19 45 41	4 1 43	19 59 28	3 3 15	20 57 56
34.	5 30 15	18 30 56	4 52 17	19 8 54	4 28 36	19 32 35	4 11 22	19 49 49	3 57 7	20 4 4	2 56 5	21 5 6
36.	5 28 7	18 33 4	4 49 6	19 12 5	4 24 41	19 36 30	4 6 52	19 54 19	3 52 5	20 9 6	2 48 4	21 13 7
38.	5 25 51	18 35 20	4 45 41	19 15 30	4 20 27	19 40 44	4 1 58	19 59 13	3 46 35	20 14 36	2 38 59	21 22 12
40.	5 23 27	18 37 44	4 41 59	19 18 12	4 15 51	19 45 20	3 56 37	20 4 34	3 40 32	20 20 39	2 28 36	21 32 35
42.	5 20 54	18 40 17	4 37 59	19 23 12	4 10 49	19 50 22	3 50 43	20 10 28	3 33 50	20 27 21	2 16 31	21 44 40
44.	5 18 11	18 43 0	4 33 39	19 27 32	4 5 17	19 55 54	3 44 12	20 16 59	3 26 23	20 34 48	2 2 7	21 59 4
46.	5 15 15	18 45 56	4 28 54	19 32 17	3 59 11	20 2 0	3 36 57	20 24 14	3 18 0	20 43 11	1 44 18	22 16 53
48.	5 12 5	18 49 6	4 23 40	19 37 31	3 52 24	20 8 47	3 28 48	20 32 23	3 10 31	20 52 40	1 20 36	22 40 35
50.	5 8 39	18 52 32	4 17 54	19 43 17	3 44 45	20 16 22	3 19 35	20 41 36	2 57 36	21 3 35	0 41 22	23 19 49
52.	5 4 53	18 56 18	4 11 28	19 49 43	3 36 14	20 24 57	3 9 1	20 52 10	2 44 53	21 16 18	0 0 0	24 0 0
54.	5 0 45	19 0 26	4 4 14	19 56 57	3 26 27	20 34 44	2 56 42	21 4 29	2 29 43	21 31 28	0 0 0	24 0 0
56.	4 56 11	19 5 0	3 56 3	20 5 8	3 15 7	20 46 4	2 42 6	21 19 5	2 11 1	21 50 10	0 0 0	24 0 0
58.	4 51 3	19 10 8	3 46 39	20 14 32	3 1 45	20 59 26	2 24 13	21 36 58	1 46 33	22 14 38	0 0 0	24 0 0
60.	4 45 17	19 15 54	3 35 44	20 25 27	2 45 35	21 15 32	2 1 17	21 59 54	1 9 53	22 51 18	0 0 0	24 0 0
62.	4 38 41	19 22 30	3 22 49	20 38 22	2 25 30	21 35 41	1 28 48	22 32 23	0 0 0	24 0 0	0 0 0	24 0 0
64.	4 31 4	19 30 7	3 7 10	20 54 1	1 36 45	22 2 26	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
66.	4 22 8	19 39 3	2 47 35	21 13 36	1 17 47	22 43 24	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	4 11 27	19 49 44	2 21 46	21 39 25	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	3 58 24	20 2 47	1 43 52	22 17 19	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	3 41 56	20 15 15	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	3 20 15	20 40 56	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	2 49 41	21 11 30	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	1 59 58	22 1 13	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	SCREEN	HEIGHT = C.	DECLINATION OF SUN AT NECN		EQUATION OF TIME		1000.		400.		1000.	
				SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	C	C	C	24 C	24 C	10 35 32	13 18 27	2 55 43	20 58 16	C	C	C	C
-86.	C	C	C	24 C	24 C	7 47 7	16 6 52	4 31 53	19 22 6	C	C	C	C
-84.	C	C	C	24 C	24 C	7 7 C	16 46 59	4 59 6	18 54 53	3 2 33	20 51 26	C	C
-82.	C	C	C	24 C	24 C	6 47 18	17 6 41	5 11 48	18 42 11	3 49 59	20 4 C	C	C
-80.	C	C	C	24 C	24 C	6 25 14	17 18 45	5 18 55	18 35 4	4 15 5	19 38 54	C	C
-78.	C	C	C	24 C	24 C	6 26 55	17 27 4	5 23 15	18 30 44	4 30 40	19 23 19	C	C
-76.	C	C	C	24 C	24 C	6 20 42	17 33 17	5 26 1	18 27 58	4 41 11	19 12 48	C	C
-74.	C	C	C	24 C	24 C	6 15 46	17 38 13	5 27 48	18 26 11	4 48 39	19 5 20	1 22 22	22 31 37
-72.	C	C	C	24 C	24 C	6 11 43	17 42 16	5 28 56	18 25 3	4 54 8	18 59 51	2 8 35	21 45 24
-70.	C	C	C	24 C	24 C	6 8 16	17 45 43	5 29 37	18 24 22	4 58 14	18 55 45	2 36 29	21 17 30
-68.	C	C	C	24 C	24 C	6 5 14	17 48 45	5 29 57	18 24 2	5 1 20	18 52 39	2 56 10	20 57 49
-66.	C	C	C	24 C	24 C	6 2 32	17 51 27	5 30 2	18 23 57	5 3 42	18 50 17	3 11 1	20 42 58
-64.	C	C	C	24 C	24 C	6 C 5	17 53 54	5 29 55	18 24 4	5 5 30	18 48 29	3 22 39	20 31 20
-62.	C	C	C	24 C	24 C	5 57 48	17 56 11	5 29 38	18 24 21	5 6 51	18 47 8	3 31 58	20 22 1
-60.	C	C	C	24 C	24 C	5 55 41	17 58 18	5 29 14	18 24 45	5 7 51	18 46 8	3 39 34	20 14 25
-58.	C	C	C	24 C	24 C	5 53 41	18 C 18	5 28 43	18 25 16	5 8 32	18 45 27	3 45 51	20 8 8
-56.	C	C	C	24 C	24 C	5 51 47	18 2 12	5 27 6	18 25 53	5 8 59	18 45 C	3 51 4	20 2 55
-54.	C	C	C	24 C	24 C	5 49 57	18 4 2	5 27 25	18 26 34	5 9 14	18 44 45	3 55 25	19 58 34
-52.	C	C	C	24 C	24 C	5 48 11	18 5 48	5 26 40	18 27 19	5 9 18	18 44 41	3 59 4	19 54 55
-50.	C	C	C	24 C	24 C	5 46 28	18 7 31	5 25 51	18 28 8	5 9 12	18 44 47	4 2 8	19 51 51
-48.	C	C	C	24 C	24 C	5 44 47	18 9 12	5 24 58	18 29 1	5 8 58	18 45 1	4 4 41	19 49 18
-46.	C	C	C	24 C	24 C	5 43 8	18 10 51	5 24 2	18 29 57	5 8 37	18 45 22	4 6 47	19 47 12
-44.	C	C	C	24 C	24 C	5 41 30	18 12 29	5 23 3	18 30 56	5 8 9	18 45 50	4 8 31	19 45 28
-42.	C	C	C	24 C	24 C	5 39 54	18 14 5	5 22 1	18 31 58	5 7 36	18 46 23	4 9 55	19 44 4
-40.	C	C	C	24 C	24 C	5 38 18	18 15 41	5 20 57	18 33 2	5 6 57	18 47 2	4 11 1	19 42 58
-38.	C	C	C	24 C	24 C	5 36 43	18 17 16	5 19 50	18 34 9	5 6 12	18 47 47	4 12 26	19 41 33
-36.	C	C	C	24 C	24 C	5 35 7	18 18 52	5 18 40	18 35 19	5 5 23	18 48 36	4 12 48	19 41 11
-34.	C	C	C	24 C	24 C	5 33 32	18 20 27	5 17 28	18 36 31	5 4 29	18 49 30	4 12 58	19 41 1
-32.	C	C	C	24 C	24 C	5 31 56	18 22 3	5 16 13	18 37 46	5 3 31	18 50 28	4 12 56	19 41 3
-30.	C	C	C	24 C	24 C	5 30 20	18 23 39	5 15 55	18 39 4	5 2 29	18 51 30	4 12 44	19 41 15
-28.	C	C	C	24 C	24 C	5 28 43	18 25 16	5 15 35	18 40 24	5 1 22	18 52 37	4 12 42	19 41 38
-26.	C	C	C	24 C	24 C	5 27 5	18 26 54	5 14 47	18 41 47	5 0 11	18 53 48	4 12 21	19 41 38
-24.	C	C	C	24 C	24 C	5 25 26	18 28 33	5 10 47	18 43 12	4 58 56	18 55 3	4 11 48	19 42 11
-22.	C	C	C	24 C	24 C	5 23 46	18 30 13	5 9 18	18 44 41	4 57 37	18 56 22	4 11 6	19 42 53
-20.	C	C	C	24 C	24 C	5 22 20	18 31 55	5 7 47	18 46 12	4 56 14	18 57 45	4 10 15	19 43 44
-18.	C	C	C	24 C	24 C	5 20 43	18 33 39	5 6 12	18 47 47	4 54 47	18 59 12	4 8 7	19 44 44
-16.	C	C	C	24 C	24 C	5 18 35	18 35 24	5 4 34	18 49 25	4 53 15	19 0 44	4 6 49	19 45 52
-14.	C	C	C	24 C	24 C	5 16 47	18 37 12	5 2 53	18 51 6	4 51 39	19 4 20	4 5 23	19 48 36
-12.	C	C	C	24 C	24 C	5 14 57	18 39 2	5 1 8	18 52 51	4 49 58	19 4 1	4 4 3	19 50 12
-10.	C	C	C	24 C	24 C	5 13 4	18 40 55	4 59 20	18 54 39	4 48 13	19 5 46	4 2 3	19 51 56
-8.	C	C	C	24 C	24 C	5 11 9	18 42 50	4 57 27	18 56 32	4 46 22	19 7 37	4 0 9	19 53 50
-6.	C	C	C	24 C	24 C	5 9 18	18 44 49	4 55 31	18 58 28	4 44 27	19 9 32	3 58 6	19 55 53
-4.	C	C	C	24 C	24 C	5 7 6	18 46 51	4 53 29	19 0 30	4 42 26	19 11 33	3 55 52	19 58 7
-2.	C	C	C	24 C	24 C	5 5 2	18 48 57	4 51 23	19 2 36	4 40 19	19 13 40		

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN HEIGHT = C.	100.			200.			300.			400.			1000.		
		SUNRISE	SUNSET	HEIGHT = C.	SUNRISE	SUNSET	HEIGHT = C.	SUNRISE	SUNSET	HEIGHT = C.	SUNRISE	SUNSET	HEIGHT = C.	SUNRISE	SUNSET	HEIGHT = C.
-0.	5 53 23	18 0 26	5 22 4	18 31 55	5 2 53	18 51 6	4 49 12	19 4 47	4 38 6	19 15 53	3 53 28	20 0 31				
2.	5 51 24	18 2 35	5 19 53	18 34 6	5 0 39	18 53 20	4 46 55	19 7 4	4 35 47	19 18 12	3 50 54	20 3 5				
4.	5 49 15	18 4 44	5 17 38	18 36 21	4 58 20	18 55 39	4 44 33	19 9 26	4 33 20	19 20 39	3 48 7	20 5 52				
6.	5 47 6	18 6 53	5 15 21	18 38 38	4 55 56	18 58 3	4 42 4	19 11 55	4 32 47	19 23 12	3 45 8	20 8 51				
8.	5 44 55	18 9 4	5 12 59	18 41 0	4 53 27	19 0 32	4 39 28	19 14 31	4 28 5	19 25 54	3 41 56	20 12 30				
10.	5 42 42	18 11 17	5 10 33	18 43 26	4 50 51	19 0 38	4 36 45	19 17 14	4 25 14	19 28 44	3 38 29	20 15 30				
12.	5 40 27	18 13 32	5 8 3	18 45 56	4 48 9	19 5 50	4 33 53	19 20 6	4 22 15	19 31 44	3 34 47	20 19 12				
14.	5 38 10	18 15 49	5 5 27	18 48 32	4 45 20	19 8 39	4 30 53	19 23 6	4 19 5	19 34 54	3 30 48	20 23 11				
16.	5 35 50	18 18 9	5 2 45	18 51 14	4 42 23	19 11 36	4 27 43	19 26 16	4 15 44	19 38 15	3 26 31	20 27 28				
18.	5 33 27	18 20 32	4 59 57	18 54 2	4 39 16	19 14 43	4 24 23	19 29 36	4 12 11	19 41 48	3 21 52	20 32 7				
20.	5 31 1	18 22 58	4 57 1	18 56 58	4 36 1	19 17 58	4 20 51	19 33 8	4 8 25	19 45 34	3 16 50	20 37 9				
22.	5 28 30	18 25 29	4 53 58	19 0 1	4 32 34	19 21 25	4 17 6	19 36 53	4 4 24	19 49 35	3 11 23	20 42 36				
24.	5 25 54	18 28 5	4 50 45	19 3 14	4 28 56	19 25 3	4 13 7	19 40 52	4 0 6	19 53 53	3 5 26	20 48 33				
26.	5 23 12	18 30 47	4 47 23	19 6 36	4 25 5	19 28 54	4 8 52	19 45 7	3 55 30	19 58 29	2 58 55	20 55 4				
28.	5 20 25	18 33 34	4 43 50	19 10 9	4 20 59	19 33 0	4 4 20	19 49 39	3 50 34	20 3 25	2 51 44	21 2 15				
30.	5 17 31	18 36 28	4 40 4	19 13 55	4 16 36	19 37 23	3 59 28	19 54 31	3 45 14	20 8 45	2 43 47	21 10 12				
32.	5 14 28	18 39 31	4 36 5	19 17 54	4 11 55	19 42 4	3 54 13	19 59 46	3 39 29	20 14 30	2 34 53	21 19 6				
34.	5 11 17	18 42 42	4 31 50	19 22 9	4 6 54	19 47 5	3 48 33	20 5 26	3 33 12	20 20 47	2 24 50	21 29 9				
36.	5 7 56	18 46 3	4 27 17	19 26 42	4 1 28	19 52 31	3 42 23	20 11 36	3 26 21	20 27 38	2 13 19	21 40 9				
38.	5 4 23	18 49 36	4 22 24	19 31 35	3 55 35	19 58 24	3 35 39	20 18 20	3 18 48	20 35 11	1 59 50	21 54 9				
40.	5 37 18	18 52 22	4 17 8	19 36 51	3 49 10	20 4 49	3 28 15	20 25 44	3 10 26	20 43 33	1 43 32	22 10 27				
42.	4 56 36	18 57 23	4 11 25	19 42 34	3 42 9	20 11 50	3 20 3	20 33 56	2 51 5	20 52 54	1 22 43	22 31 16				
44.	4 52 17	19 1 42	4 5 11	19 48 48	3 34 23	20 19 36	3 10 55	20 43 4	2 50 31	21 3 28	0 52 11	23 1 48				
46.	4 47 39	19 6 20	3 58 21	19 55 38	3 25 45	20 28 14	3 0 36	20 53 23	2 38 24	21 15 35	0 0 0	24 0 0				
48.	4 42 39	19 11 21	3 50 48	20 3 11	3 16 3	20 37 56	2 48 47	21 5 12	2 24 13	21 29 46	0 0 0	24 0 0				
50.	4 37 9	19 16 50	3 42 22	20 11 37	3 5 2	20 48 57	2 35 3	21 18 56	2 10 10	21 46 49	0 0 0	24 0 0				
52.	4 31 8	19 22 51	3 32 54	20 21 5	2 52 18	21 1 41	2 18 39	21 35 20	1 45 41	22 8 18	0 0 0	24 0 0				
54.	4 24 28	19 29 31	3 22 6	20 31 53	2 37 18	21 16 41	1 58 18	21 55 41	1 15 52	22 38 7	0 0 0	24 0 0				
56.	4 17 2	19 36 57	3 9 37	20 44 22	2 19 5	21 34 54	1 31 7	22 22 52	0 6 58	23 47 1	0 0 0	24 0 0				
58.	4 8 38	19 45 21	2 54 55	20 55 4	1 55 54	21 58 5	0 46 12	23 7 47	0 0 0	24 0 0	0 0 0	24 0 0				
60.	3 59 3	19 54 56	2 37 5	21 16 54	1 23 17	22 20 42	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
62.	3 47 56	20 6 3	2 14 33	21 39 26	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
64.	3 34 46	20 15 11	1 43 47	22 10 12	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
66.	3 18 56	20 35 3	0 50 49	23 3 10	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
68.	2 59 7	20 54 52	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
70.	2 33 2	21 20 57	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
72.	1 55 14	21 58 45	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
74.	0 36 41	23 17 18	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0				

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	DECLINATION OF SUN AT NCCN		EQUATION OF TIME		C-66		400.		1000.										
		SUNRISE 100. 30.	SUNSET 100. 30.	SUNRISE 200. 30.	SUNSET 200. 30.	SUNRISE 400. 30.	SUNSET 400. 30.	SUNRISE 1000. 30.	SUNSET 1000. 30.											
-8P.	24	0	0	0	0	0	0	5	23	58	18	28	49	0	0	24	0	0		
-86.	24	0	0	0	0	9	21	51	5	38	10	18	14	37	0	0	24	0	0	
-84.	24	0	0	0	0	7	27	10	5	41	58	18	10	49	0	0	24	0	0	
-82.	24	0	0	0	0	7	1	18	5	43	10	18	9	37	0	0	24	0	0	
-80.	24	0	0	0	0	6	45	35	5	43	21	18	9	26	0	0	24	0	0	
-78.	24	0	0	0	0	6	34	54	5	42	0	18	9	47	1	28	9	22	24	38
-76.	24	0	0	0	0	6	26	54	5	42	21	18	10	26	2	22	55	21	29	52
-74.	24	0	0	0	0	6	20	35	5	41	31	18	11	16	2	53	40	20	59	7
-72.	24	0	0	0	0	6	15	23	5	40	23	18	12	14	3	14	24	20	38	23
-70.	24	0	0	0	0	6	10	57	5	39	29	18	13	18	3	29	28	20	23	19
-68.	24	0	0	0	0	6	7	5	5	38	21	18	14	26	3	40	54	20	11	53
-66.	24	0	0	0	0	6	3	37	5	37	10	18	15	37	3	49	48	20	2	59
-64.	24	0	0	0	0	5	57	35	5	35	56	18	16	51	3	56	51	19	55	56
-62.	24	0	0	0	0	5	57	35	5	34	39	18	18	8	4	7	4	19	50	17
-60.	24	0	0	0	0	5	52	19	5	33	20	18	19	27	4	7	4	19	45	43
-58.	24	0	0	0	0	5	52	19	5	31	59	18	20	48	4	10	46	19	42	1
-56.	24	0	0	0	0	5	49	53	5	30	36	18	22	11	4	13	45	19	39	2
-54.	24	0	0	0	0	5	47	33	5	45	14	18	23	35	4	16	10	19	36	4
-52.	24	0	0	0	0	5	45	16	5	43	6	18	25	2	4	18	5	19	34	42
-50.	24	0	0	0	0	5	43	6	5	40	57	18	26	30	4	19	35	19	33	12
-48.	24	0	0	0	0	5	40	57	5	38	51	18	27	59	4	20	43	19	32	4
-46.	24	0	0	0	0	5	38	51	5	36	46	18	29	31	4	21	32	19	31	15
-44.	24	0	0	0	0	5	36	46	5	34	43	18	31	4	4	22	4	19	30	43
-42.	24	0	0	0	0	5	34	43	5	32	41	18	32	39	4	22	21	19	30	22
-40.	24	0	0	0	0	5	32	41	5	30	39	18	34	16	4	22	25	19	30	22
-38.	24	0	0	0	0	5	30	39	5	28	37	18	35	56	4	21	16	19	30	31
-36.	24	0	0	0	0	5	28	37	5	26	35	18	37	37	4	21	56	19	30	51
-34.	24	0	0	0	0	5	26	35	5	24	33	18	39	20	4	21	25	19	31	22
-32.	24	0	0	0	0	5	24	33	5	22	30	18	41	6	4	20	45	19	32	2
-30.	24	0	0	0	0	5	22	30	5	20	26	18	42	54	4	18	55	19	32	52
-28.	24	0	0	0	0	5	20	26	5	18	23	18	44	45	4	18	56	19	33	51
-26.	24	0	0	0	0	5	18	23	5	16	9	18	46	38	4	17	48	19	34	59
-24.	24	0	0	0	0	5	16	13	5	14	5	18	48	35	4	16	32	19	36	15
-22.	24	0	0	0	0	5	14	5	5	12	13	18	50	34	4	15	8	19	37	39
-20.	24	0	0	0	0	5	11	54	5	10	4	18	52	37	4	13	54	19	39	12
-18.	24	0	0	0	0	5	9	41	5	8	4	18	54	43	4	11	55	19	40	53
-16.	24	0	0	0	0	5	7	25	5	6	55	18	56	52	4	10	5	19	42	42
-14.	24	0	0	0	0	5	5	2	5	53	21	19	59	6	4	8	7	19	44	40
-12.	24	0	0	0	0	5	2	45	4	51	23	19	1	24	4	6	4	19	46	46
-10.	24	0	0	0	0	5	0	20	4	49	1	19	3	46	4	3	46	19	49	1
-8.	24	0	0	0	0	5	57	52	4	46	34	19	6	13	4	1	21	19	51	26
-6.	24	0	0	0	0	4	55	18	4	44	1	19	8	46	3	58	4	19	53	59
-4.	24	0	0	0	0	4	52	41	4	41	23	19	11	24	3	56	4	19	56	43
-2.	24	0	0	0	0	4	49	58	4	38	40	19	14	7	3	53	9	19	59	38

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.	SUNRISE	SUNSET	1000.	300.	400.	500.	600.	700.	800.	900.	1000.
-C.	5	5	5	5	5	5	5	5	5	5	5	5	5
10.	5	5	5	5	5	5	5	5	5	5	5	5	5
12.	5	5	5	5	5	5	5	5	5	5	5	5	5
14.	5	5	5	5	5	5	5	5	5	5	5	5	5
16.	5	5	5	5	5	5	5	5	5	5	5	5	5
18.	5	5	5	5	5	5	5	5	5	5	5	5	5
20.	5	5	5	5	5	5	5	5	5	5	5	5	5
22.	5	5	5	5	5	5	5	5	5	5	5	5	5
24.	5	5	5	5	5	5	5	5	5	5	5	5	5
26.	5	5	5	5	5	5	5	5	5	5	5	5	5
28.	5	5	5	5	5	5	5	5	5	5	5	5	5
30.	5	5	5	5	5	5	5	5	5	5	5	5	5
32.	5	5	5	5	5	5	5	5	5	5	5	5	5
34.	5	5	5	5	5	5	5	5	5	5	5	5	5
36.	5	5	5	5	5	5	5	5	5	5	5	5	5
38.	5	5	5	5	5	5	5	5	5	5	5	5	5
40.	5	5	5	5	5	5	5	5	5	5	5	5	5
42.	5	5	5	5	5	5	5	5	5	5	5	5	5
44.	5	5	5	5	5	5	5	5	5	5	5	5	5
46.	5	5	5	5	5	5	5	5	5	5	5	5	5
48.	5	5	5	5	5	5	5	5	5	5	5	5	5
50.	5	5	5	5	5	5	5	5	5	5	5	5	5
52.	5	5	5	5	5	5	5	5	5	5	5	5	5
54.	5	5	5	5	5	5	5	5	5	5	5	5	5
56.	5	5	5	5	5	5	5	5	5	5	5	5	5
58.	5	5	5	5	5	5	5	5	5	5	5	5	5
60.	5	5	5	5	5	5	5	5	5	5	5	5	5
62.	5	5	5	5	5	5	5	5	5	5	5	5	5
64.	5	5	5	5	5	5	5	5	5	5	5	5	5
66.	5	5	5	5	5	5	5	5	5	5	5	5	5
68.	5	5	5	5	5	5	5	5	5	5	5	5	5
70.	5	5	5	5	5	5	5	5	5	5	5	5	5
72.	5	5	5	5	5	5	5	5	5	5	5	5	5
74.	5	5	5	5	5	5	5	5	5	5	5	5	5
76.	5	5	5	5	5	5	5	5	5	5	5	5	5
78.	5	5	5	5	5	5	5	5	5	5	5	5	5
80.	5	5	5	5	5	5	5	5	5	5	5	5	5
82.	5	5	5	5	5	5	5	5	5	5	5	5	5
84.	5	5	5	5	5	5	5	5	5	5	5	5	5
86.	5	5	5	5	5	5	5	5	5	5	5	5	5
88.	5	5	5	5	5	5	5	5	5	5	5	5	5

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	63	6	1	DECLINATION OF SUN AT NOON		EQUATION OF TIME		400.		1000.	
				SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
LAT											
-98.				24	0	0	0	0	0	0	0
-86.				24	0	0	0	9	7	10	14
-84.				24	0	0	0	7	52	12	16
-82.				24	0	0	0	7	19	0	16
-80.				24	0	0	0	6	59	15	16
-78.				24	0	0	0	6	45	55	17
-76.				24	0	0	0	6	35	59	17
-74.				24	0	0	0	6	28	11	17
-72.				24	0	0	0	6	21	47	17
-70.				24	0	0	0	6	16	22	17
-68.				24	0	0	0	6	11	37	17
-66.				24	0	0	0	6	7	24	17
-64.				24	0	0	0	6	3	35	17
-62.				24	0	0	0	6	0	3	17
-60.				24	0	0	0	5	56	46	17
-58.				24	0	0	0	5	53	41	18
-56.				24	0	0	0	5	50	44	18
-54.				24	0	0	0	5	47	55	18
-52.				24	0	0	0	5	45	1	18
-50.				24	0	0	0	5	42	33	18
-48.				24	0	0	0	5	39	58	18
-46.				24	0	0	0	5	37	25	18
-44.				24	0	0	0	5	34	56	18
-42.				24	0	0	0	5	32	27	18
-40.				24	0	0	0	5	30	0	18
-38.				24	0	0	0	5	27	34	18
-36.				24	0	0	0	5	25	8	18
-34.				24	0	0	0	5	22	42	18
-32.				24	0	0	0	5	17	47	18
-30.				24	0	0	0	5	15	18	18
-28.				24	0	0	0	5	12	48	18
-26.				24	0	0	0	5	10	15	18
-24.				24	0	0	0	5	7	41	18
-22.				24	0	0	0	5	5	4	18
-20.				24	0	0	0	5	2	24	18
-18.				24	0	0	0	4	59	41	18
-16.				24	0	0	0	4	56	54	18
-14.				24	0	0	0	4	51	9	19
-12.				24	0	0	0	4	48	9	19
-10.				24	0	0	0	4	45	5	19
-8.				24	0	0	0	4	41	54	19
-6.				24	0	0	0	4	38	38	19
-4.				24	0	0	0	4	35	59	20
-2.				24	0	0	0	4	32	12	20

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.		1000.		400.		300.		200.		100.		0.	
		SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 54	0	18 1 11	5 21 11	18 34 0	5 1 5	18 54 2	4 46 51	19 8 20	4 43 25	19 11 46	4 35 14	19 19 57	3 48 16	20 6 55
2.	5 50	46	18 1 25	5 17 53	18 37 18	4 57 47	18 57 24	4 43 25	19 11 46	4 43 25	19 11 46	4 35 14	19 19 57	3 44 19	20 10 52
4.	5 47	31	18 7 40	5 14 31	18 40 40	4 54 19	19 4 52	4 39 51	19 15 20	4 39 51	19 15 20	4 28 4	19 27 7	3 40 9	20 15 2
6.	5 44	14	18 10 57	5 11 5	18 44 6	4 50 45	19 4 26	4 36 9	19 19 2	4 36 9	19 19 2	4 24 16	19 30 55	3 35 43	20 19 28
8.	5 40	56	18 14 15	5 7 34	18 47 37	4 47 3	19 8 8	4 32 19	19 22 52	4 32 19	19 22 52	4 20 18	19 34 53	3 31 0	20 24 11
10.	5 37	35	18 17 36	5 3 17	18 51 14	4 43 14	19 11 57	4 28 20	19 26 51	4 28 20	19 26 51	4 16 9	19 39 2	3 25 59	20 29 12
12.	5 34	12	18 20 59	5 0 15	18 54 56	4 39 17	19 15 54	4 24 10	19 31 1	4 24 10	19 31 1	4 11 48	19 43 23	3 20 36	20 34 35
14.	5 30	44	18 24 27	4 56 25	18 58 46	4 35 10	19 20 1	4 19 49	19 35 22	4 19 49	19 35 22	4 7 13	19 47 58	3 14 50	20 40 21
16.	5 27	13	18 27 58	4 52 27	19 2 44	4 30 52	19 24 19	4 15 15	19 39 56	4 15 15	19 39 56	4 2 24	19 52 47	3 8 38	20 46 33
18.	5 23	36	18 31 35	4 48 20	19 6 51	4 26 23	19 28 48	4 10 27	19 44 44	4 10 27	19 44 44	3 57 19	19 57 52	3 1 55	20 53 16
20.	5 19	54	18 35 17	4 44 3	19 11 8	4 21 40	19 33 31	4 5 23	19 49 48	4 5 23	19 49 48	3 51 55	20 3 16	2 54 37	21 0 34
22.	5 16	5	18 39 6	4 39 34	19 15 37	4 16 42	19 38 29	4 0 0	19 55 11	4 0 0	19 55 11	3 46 10	20 9 1	2 46 39	21 8 32
24.	5 12	8	18 43 3	4 34 53	19 20 18	4 11 28	19 43 43	3 54 18	20 0 53	3 54 18	20 0 53	3 40 2	20 15 9	2 37 51	21 17 20
26.	5 8	3	18 47 8	4 29 58	19 25 13	4 5 54	19 49 17	3 48 13	20 6 58	3 48 13	20 6 58	3 33 26	20 21 45	2 28 4	21 27 7
28.	5 3	48	18 51 23	4 24 46	19 30 25	4 0 0	19 55 11	3 41 41	20 13 30	3 41 41	20 13 30	3 26 20	20 28 51	2 17 2	21 38 9
30.	4 59	22	18 55 49	4 19 16	19 35 55	3 53 41	20 1 30	3 34 40	20 20 31	3 34 40	20 20 31	3 18 37	20 36 34	2 4 23	21 50 48
32.	4 54	43	19 0 28	4 13 25	19 41 46	3 46 53	20 8 18	3 27 3	20 28 8	3 27 3	20 28 8	3 10 12	20 44 59	1 49 31	22 5 40
34.	4 49	45	19 5 22	4 7 11	19 48 0	3 39 33	20 15 38	3 18 45	20 36 26	3 18 45	20 36 26	3 0 56	20 54 15	1 31 16	22 23 55
36.	4 44	39	19 10 32	4 0 28	19 54 43	3 31 35	20 32 36	3 9 38	20 45 33	3 9 38	20 45 33	2 50 39	21 4 32	1 6 54	22 48 17
38.	4 39	10	19 16 1	3 53 13	20 1 58	3 22 52	20 32 19	2 59 31	20 55 40	2 59 31	20 55 40	2 39 9	21 16 8	0 21 57	23 33 14
40.	4 33	19	19 21 52	3 45 21	20 9 50	3 13 15	20 41 56	2 48 11	21 7 0	2 48 11	21 7 0	2 25 48	21 29 23	0 0 0	24 0 0
42.	4 27	3	19 28 8	3 36 43	20 18 28	3 2 30	20 52 41	2 35 16	21 19 55	2 35 16	21 19 55	1 51 30	22 3 41	0 0 0	24 0 0
44.	4 20	17	19 34 54	3 27 12	20 27 59	2 50 23	21 4 48	2 20 16	21 34 55	2 20 16	21 34 55	1 27 9	22 28 2	0 0 0	24 0 0
46.	4 12	56	19 42 15	3 16 35	20 38 36	2 36 26	21 18 45	1 39 34	22 15 37	1 39 34	22 15 37	0 49 43	23 5 28	0 0 0	24 0 0
48.	4 4	54	19 50 17	3 4 36	20 50 35	2 20 2	21 35 9	1 7 21	22 47 50	1 7 21	22 47 50	0 0 0	24 0 0	0 0 0	24 0 0
50.	3 56	2	19 59 9	2 50 51	21 4 20	2 0 1	21 55 10	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
52.	3 46	9	20 9 2	2 34 42	21 20 29	1 33 53	22 21 18	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
54.	3 35	1	20 20 10	2 15 8	21 40 3	0 53	22 2 2	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
56.	3 22	16	20 32 55	1 50 6	22 5 5	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
58.	3 7	25	20 47 46	1 13 53	22 41 18	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
60.	2 49	40	21 5 31	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
62.	2 27	39	21 27 32	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
64.	1 58	28	21 56 43	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
66.	1 13	17	22 41 54	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0	0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	DECLINATION OF SUN AT NOON		EQUATION OF TIME		4CC.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
LAT								
-88-	24	24	0	0	0	0	0	0
-86-	24	24	0	0	0	0	0	0
-84-	24	24	0	0	0	0	0	0
-82-	24	24	0	0	0	0	0	0
-80-	24	24	0	0	0	0	0	0
-78-	24	24	0	0	0	0	0	0
-76-	24	24	0	0	0	0	0	0
-74-	24	24	0	0	0	0	0	0
-72-	24	24	0	0	0	0	0	0
-70-	24	24	0	0	0	0	0	0
-68-	24	24	0	0	0	0	0	0
-66-	24	24	0	0	0	0	0	0
-64-	24	24	0	0	0	0	0	0
-62-	24	24	0	0	0	0	0	0
-60-	24	24	0	0	0	0	0	0
-58-	24	24	0	0	0	0	0	0
-56-	24	24	0	0	0	0	0	0
-54-	24	24	0	0	0	0	0	0
-52-	24	24	0	0	0	0	0	0
-50-	24	24	0	0	0	0	0	0
-48-	24	24	0	0	0	0	0	0
-46-	24	24	0	0	0	0	0	0
-44-	24	24	0	0	0	0	0	0
-42-	24	24	0	0	0	0	0	0
-40-	24	24	0	0	0	0	0	0
-38-	24	24	0	0	0	0	0	0
-36-	24	24	0	0	0	0	0	0
-34-	24	24	0	0	0	0	0	0
-32-	24	24	0	0	0	0	0	0
-30-	24	24	0	0	0	0	0	0
-28-	24	24	0	0	0	0	0	0
-26-	24	24	0	0	0	0	0	0
-24-	24	24	0	0	0	0	0	0
-22-	24	24	0	0	0	0	0	0
-20-	24	24	0	0	0	0	0	0
-18-	24	24	0	0	0	0	0	0
-16-	24	24	0	0	0	0	0	0
-14-	24	24	0	0	0	0	0	0
-12-	24	24	0	0	0	0	0	0
-10-	24	24	0	0	0	0	0	0
-8-	24	24	0	0	0	0	0	0
-6-	24	24	0	0	0	0	0	0
-4-	24	24	0	0	0	0	0	0
-2-	24	24	0	0	0	0	0	0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.		100.		200.		300.		400.		1000.	
		SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5	56 22	18 2 37	5 23 14	18 36 45	5 2 1	18 56 58	4 48 34	19 11 25	4 36 49	19 23 10	3 49 17	20 10 42
2.	5	52 55	18 7 4	5 19 43	18 40 16	4 55 25	19 0 34	4 44 54	19 15 5	4 33 4	19 26 55	3 45 5	20 14 54
4.	5	45 27	18 10 32	5 16 2	18 43 51	4 55 43	19 4 16	4 41 6	19 18 53	4 29 11	19 30 48	3 40 38	20 19 21
6.	5	45 58	18 14 1	5 12 29	18 47 30	4 51 55	19 8 4	4 37 10	19 22 49	4 25 8	19 34 51	3 35 54	20 24 5
8.	5	42 27	18 17 32	5 8 44	18 51 15	4 48 0	19 11 59	4 33 6	19 26 53	4 20 55	19 39 4	3 30 53	20 29 6
10.	5	38 53	18 21 6	5 4 54	18 55 5	4 43 57	19 16 2	4 28 51	19 31 8	4 16 30	19 43 29	3 25 31	20 34 28
12.	5	35 16	18 24 43	5 0 57	18 59 2	4 39 44	19 20 15	4 24 26	19 35 33	4 11 53	19 48 6	3 19 48	20 40 11
14.	5	31 35	18 28 24	4 56 53	19 3 6	4 35 22	19 24 37	4 19 49	19 40 10	4 7 2	19 52 57	3 13 39	20 46 20
16.	5	27 49	18 32 10	4 52 40	19 7 19	4 30 48	19 29 11	4 14 58	19 45 1	4 1 55	19 58 4	3 7 2	20 52 57
18.	5	23 59	18 36 0	4 48 17	19 11 42	4 26 2	19 33 57	4 9 52	19 50 7	3 56 30	20 3 29	2 59 51	21 0 8
20.	5	20 1	18 39 58	4 43 44	19 16 15	4 21 2	19 38 37	4 4 28	19 55 31	3 50 46	20 9 13	2 52 3	21 7 36
22.	5	15 57	18 44 2	4 38 59	19 21 0	4 15 45	19 44 14	3 58 46	20 1 13	3 44 39	20 15 20	2 43 28	21 16 31
24.	5	11 45	18 48 14	4 34 0	19 25 59	4 10 11	19 49 48	3 52 42	20 7 17	3 38 7	20 21 52	2 33 59	21 26 0
26.	5	7 23	18 52 36	4 28 46	19 36 45	4 2 17	19 55 42	3 46 13	20 13 46	3 31 6	20 28 53	2 23 22	21 36 37
28.	5	2 50	18 57 9	4 23 14	19 36 45	3 57 59	20 2 0	3 39 16	20 20 43	3 23 31	20 36 28	2 11 18	21 48 41
30.	4	58 6	19 1 53	4 17 22	19 42 37	3 51 15	20 8 44	3 31 46	20 28 13	3 15 16	20 44 43	1 57 16	22 2 43
32.	4	53 8	19 6 51	4 11 8	19 48 51	3 44 1	20 15 58	3 23 38	20 36 21	2 56 15	21 3 44	1 40 23	22 19 36
34.	4	47 53	19 12 6	3 57 18	20 2 41	3 36 10	20 23 49	3 14 44	20 45 15	2 45 6	21 14 53	0 45 50	23 14 9
36.	4	42 21	19 17 38	3 51 18	20 10 27	3 27 38	20 32 21	2 53 59	21 6 0	2 32 27	21 27 32	0 0 0	24 0 0
38.	4	36 29	19 23 30	3 45 32	20 18 54	3 21 52	20 52 7	2 41 37	21 18 22	2 17 48	21 42 11	0 0 0	24 0 0
40.	4	30 12	19 29 47	3 31 48	20 28 11	2 56 13	21 3 46	2 27 24	21 32 35	2 0 21	21 59 38	0 0 0	24 0 0
42.	4	23 27	19 36 32	3 21 31	20 38 28	2 42 56	21 17 3	2 10 57	21 49 22	1 38 26	22 21 33	0 0 0	24 0 0
44.	4	16 10	19 43 49	3 9 58	20 50 1	2 27 29	21 32 30	1 49 56	22 10 3	1 7 38	22 52 21	0 0 0	24 0 0
46.	4	8 14	19 51 45	2 56 51	21 18 22	2 8 58	21 51 1	1 22 15	22 37 44	0 0 0	24 0 0	0 0 0	24 0 0
48.	3	59 55	20 0 27	2 41 37	21 36 31	1 45 34	22 14 35	0 32 27	23 27 32	0 0 0	24 0 0	0 0 0	24 0 0
50.	3	49 55	20 10 4	2 23 28	21 59 9	1 12 20	22 47 39	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
52.	3	39 8	20 20 51	2 13 50	22 33 4	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
54.	3	26 54	20 33 51	2 0 32	22 55 5	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
56.	3	12 49	20 47 10	1 30 4	22 29 55	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
58.	2	56 12	21 3 47	0 32	23 27 56	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
60.	2	35 58	21 24 1	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
62.	1	33 5	22 26 54	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
64.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
66.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0	0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

[illegible]

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5 59 58	18 7 13	5 26 52	18 40 19	5 6 41	19 0 30	4 52 15	19 14 56	4 40 31	19 26 40	3 53 3	20 14 8
2.	5 56 32	18 10 38	5 23 23	18 43 48	5 3 6	19 4 5	4 48 36	19 18 35	4 36 48	19 30 23	3 48 53	20 18 18
4.	5 53 6	18 14 5	5 19 50	18 47 21	4 59 26	19 7 45	4 45 30	19 22 21	4 32 56	19 34 15	3 44 27	20 22 44
6.	5 49 39	18 17 32	5 16 12	18 50 59	4 55 40	19 11 31	4 40 56	19 26 15	4 28 55	19 38 16	3 39 46	20 27 25
8.	5 46 9	18 21 2	5 12 29	18 54 42	4 51 46	19 15 25	4 36 53	19 30 18	4 24 43	19 42 28	3 34 47	20 32 24
10.	5 42 37	18 24 34	5 8 40	18 58 31	4 47 45	19 19 28	4 32 41	19 34 30	4 20 31	19 46 50	3 29 28	20 37 43
12.	5 39 1	18 28 10	5 4 45	19 2 26	4 43 34	19 23 37	4 28 17	19 38 54	4 15 45	19 51 26	3 23 47	20 43 24
14.	5 35 22	18 31 49	5 0 42	19 6 29	4 39 14	19 27 57	4 23 42	19 43 29	4 10 56	19 56 15	3 17 41	20 49 30
16.	5 31 38	18 35 33	4 56 31	19 10 40	4 34 42	19 32 29	4 18 53	19 48 18	4 5 29	20 1 20	3 11 6	20 56 5
18.	5 27 49	18 39 22	4 52 10	19 15 1	4 29 57	19 37 14	4 13 49	19 53 22	4 0 29	20 6 42	3 3 59	21 3 12
20.	5 23 53	18 43 18	4 47 39	19 19 32	4 24 59	19 42 12	4 8 28	19 58 43	3 54 47	20 12 24	2 56 14	21 10 57
22.	5 19 51	18 47 20	4 42 56	19 24 15	4 19 45	19 47 26	4 2 48	20 4 23	3 48 43	20 18 28	2 47 44	21 19 27
24.	5 15 40	18 51 31	4 37 59	19 29 12	4 14 13	19 52 58	3 56 47	20 10 24	3 42 14	20 24 57	2 38 20	21 28 51
26.	5 11 20	18 55 51	4 32 47	19 34 24	4 8 21	19 58 50	3 50 21	20 16 50	3 35 16	20 31 55	2 27 49	21 39 22
28.	5 6 50	19 0 21	4 27 18	19 39 53	4 2 7	20 5 4	3 43 27	20 23 44	3 27 44	20 39 27	2 15 53	21 51 18
30.	5 2 8	19 5 5	4 21 29	19 45 42	3 55 26	20 11 45	3 36 1	20 31 11	3 19 33	20 47 38	2 2 2	22 5 10
32.	4 57 12	19 9 59	4 15 18	19 51 53	3 48 14	20 18 57	3 27 55	20 38 16	3 10 36	20 56 35	1 45 24	22 14 47
34.	4 52 0	19 15 11	4 8 40	19 58 31	3 40 28	20 26 43	3 19 6	20 43 5	2 49 39	21 17 32	0 52 47	23 14 24
36.	4 46 31	19 20 40	4 1 33	20 5 38	3 31 59	20 35 12	3 9 22	20 57 49	2 43 58	22 23 13	0 0 0	24 0 0
38.	4 40 41	19 26 30	3 53 51	20 13 20	3 22 42	20 44 29	2 46 18	21 8 39	2 37 8	22 30 31	0 0 0	24 0 0
40.	4 34 27	19 32 44	3 45 28	20 21 43	3 12 24	20 54 47	2 32 15	21 34 56	2 22 40	22 44 31	0 0 0	24 0 0
42.	4 27 46	19 39 25	3 36 16	20 30 55	3 0 51	21 6 20	2 15 41	21 51 30	1 43 58	22 53 2	0 0 0	24 0 0
44.	4 20 32	19 46 39	3 26 4	20 41 7	2 47 43	21 19 26	2 15 41	22 11 50	1 14 0	23 0 0	0 0 0	24 0 0
46.	4 12 41	19 54 30	3 14 39	20 52 32	2 32 28	21 34 43	1 28 23	22 38 48	0 0 0	24 0 0	0 0 0	24 0 0
48.	4 4 3	20 2 8	3 1 40	21 5 31	2 14 13	21 52 58	0 0 0	23 24 52	0 0 0	24 0 0	0 0 0	24 0 0
50.	3 54 31	20 12 35	2 46 37	21 20 34	1 51 16	22 15 55	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
52.	3 47 51	20 23 20	2 38 27	21 38 27	1 19 7	22 48 4	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
54.	3 31 46	20 35 25	2 28 44	22 0 41	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
56.	3 17 50	20 45 21	2 16 34	22 30 37	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
58.	3 1 26	21 5 45	2 3 26	23 23 45	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
60.	2 41 32	21 15 3	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
62.	2 16 8	21 51 3	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
64.	1 40 20	22 26 51	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
66.	0 0 0	23 1 48	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	SCREEN HEIGHT = C.	DECLINATION OF SUN AT NOON	EQUATION OF TIME -G.C.39		2000.		1000.	
				SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
				24 C	24 C	0 C	0 C	0 C	0 C
-88.	-88.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-86.	-86.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-84.	-84.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-82.	-82.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-80.	-80.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-78.	-78.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-76.	-76.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-74.	-74.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-72.	-72.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-70.	-70.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-68.	-68.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-66.	-66.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-64.	-64.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-62.	-62.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-60.	-60.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-58.	-58.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-56.	-56.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-54.	-54.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-52.	-52.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-50.	-50.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-48.	-48.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-46.	-46.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-44.	-44.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-42.	-42.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-40.	-40.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-38.	-38.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-36.	-36.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-34.	-34.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-32.	-32.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-30.	-30.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-28.	-28.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-26.	-26.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-24.	-24.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-22.	-22.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-20.	-20.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-18.	-18.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-16.	-16.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-14.	-14.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-12.	-12.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-10.	-10.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-8.	-8.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-6.	-6.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-4.	-4.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C
-2.	-2.	24 C	24 C	24 C	24 C	0 C	0 C	0 C	0 C

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.	HEIGHT = C.	1000.	400.	300.	200.	100.	0.	100.	200.	300.	400.	500.
-0.	SUNRISE	SUNSET	SUNRISE	SUNRISE	SUNRISE	SUNRISE	SUNRISE	SUNRISE	SUNRISE	SUNRISE	SUNRISE	SUNRISE	SUNRISE	SUNRISE
0.	6 1 48	18 18 59	5 29 5	5 5 7	4 54 52	4 54 52	4 54 52	4 54 52	4 54 52	4 54 52	4 54 52	4 54 52	4 54 52	4 54 52
2.	5 58 38	18 12 9	5 25 51	5 4 49	4 51 29	4 51 29	4 51 29	4 51 29	4 51 29	4 51 29	4 51 29	4 51 29	4 51 29	4 51 29
4.	5 55 27	18 15 20	5 22 33	5 2 25	4 48 0	4 48 0	4 48 0	4 48 0	4 48 0	4 48 0	4 48 0	4 48 0	4 48 0	4 48 0
6.	5 52 15	18 18 32	5 19 11	4 58 55	4 44 22	4 44 22	4 44 22	4 44 22	4 44 22	4 44 22	4 44 22	4 44 22	4 44 22	4 44 22
8.	5 49 0	18 21 47	5 15 44	4 55 18	4 40 37	4 40 37	4 40 37	4 40 37	4 40 37	4 40 37	4 40 37	4 40 37	4 40 37	4 40 37
10.	5 45 44	18 25 3	5 12 12	4 51 33	4 36 42	4 36 42	4 36 42	4 36 42	4 36 42	4 36 42	4 36 42	4 36 42	4 36 42	4 36 42
12.	5 42 24	18 28 23	5 9 48	4 47 40	4 32 37	4 32 37	4 32 37	4 32 37	4 32 37	4 32 37	4 32 37	4 32 37	4 32 37	4 32 37
14.	5 39 1	18 31 46	5 6 34	4 43 38	4 28 21	4 28 21	4 28 21	4 28 21	4 28 21	4 28 21	4 28 21	4 28 21	4 28 21	4 28 21
16.	5 35 34	18 35 13	5 3 52	4 39 25	4 23 52	4 23 52	4 23 52	4 23 52	4 23 52	4 23 52	4 23 52	4 23 52	4 23 52	4 23 52
18.	5 32 1	18 38 46	5 0 56	4 35 0	4 19 9	4 19 9	4 19 9	4 19 9	4 19 9	4 19 9	4 19 9	4 19 9	4 19 9	4 19 9
20.	5 28 23	18 42 24	4 56 52	4 30 23	4 14 13	4 14 13	4 14 13	4 14 13	4 14 13	4 14 13	4 14 13	4 14 13	4 14 13	4 14 13
22.	5 24 39	18 46 8	4 52 40	4 26 31	4 8 54	4 8 54	4 8 54	4 8 54	4 8 54	4 8 54	4 8 54	4 8 54	4 8 54	4 8 54
24.	5 20 47	18 50 0	4 48 17	4 22 39	4 3 20	4 3 20	4 3 20	4 3 20	4 3 20	4 3 20	4 3 20	4 3 20	4 3 20	4 3 20
26.	5 16 47	18 54 0	4 43 41	4 18 56	3 57 20	3 57 20	3 57 20	3 57 20	3 57 20	3 57 20	3 57 20	3 57 20	3 57 20	3 57 20
28.	5 12 37	19 58 10	4 38 52	4 14 56	3 50 56	3 50 56	3 50 56	3 50 56	3 50 56	3 50 56	3 50 56	3 50 56	3 50 56	3 50 56
30.	5 8 17	19 2 30	4 33 46	4 10 56	3 44 3	3 44 3	3 44 3	3 44 3	3 44 3	3 44 3	3 44 3	3 44 3	3 44 3	3 44 3
32.	5 3 44	19 7 3	4 28 39	4 6 56	3 36 36	3 36 36	3 36 36	3 36 36	3 36 36	3 36 36	3 36 36	3 36 36	3 36 36	3 36 36
34.	4 58 56	19 11 51	4 22 39	4 2 56	3 28 29	3 28 29	3 28 29	3 28 29	3 28 29	3 28 29	3 28 29	3 28 29	3 28 29	3 28 29
36.	4 53 53	19 16 54	4 16 31	4 0 50	3 19 34	3 19 34	3 19 34	3 19 34	3 19 34	3 19 34	3 19 34	3 19 34	3 19 34	3 19 34
38.	4 48 31	19 22 16	4 10 57	3 56 20	3 9 42	3 9 42	3 9 42	3 9 42	3 9 42	3 9 42	3 9 42	3 9 42	3 9 42	3 9 42
40.	4 42 48	19 27 59	3 55 9	3 52 46	2 58 38	2 58 38	2 58 38	2 58 38	2 58 38	2 58 38	2 58 38	2 58 38	2 58 38	2 58 38
42.	4 36 40	19 34 7	3 46 44	3 42 44	2 46 5	2 46 5	2 46 5	2 46 5	2 46 5	2 46 5	2 46 5	2 46 5	2 46 5	2 46 5
44.	4 30 4	19 40 42	3 37 26	3 32 54	2 41 34	2 41 34	2 41 34	2 41 34	2 41 34	2 41 34	2 41 34	2 41 34	2 41 34	2 41 34
46.	4 22 53	19 47 54	3 27 5	3 23 21	2 31 34	2 31 34	2 31 34	2 31 34	2 31 34	2 31 34	2 31 34	2 31 34	2 31 34	2 31 34
48.	4 15 3	19 55 44	3 15 25	3 12 54	2 14 10	2 14 10	2 14 10	2 14 10	2 14 10	2 14 10	2 14 10	2 14 10	2 14 10	2 14 10
50.	4 6 24	20 4 23	3 2 4	2 0 55	1 52 42	1 52 42	1 52 42	1 52 42	1 52 42	1 52 42	1 52 42	1 52 42	1 52 42	1 52 42
52.	3 56 47	20 14 0	2 46 28	2 1 43	1 47 56	1 47 56	1 47 56	1 47 56	1 47 56	1 47 56	1 47 56	1 47 56	1 47 56	1 47 56
54.	3 45 58	20 24 49	2 27 42	2 1 43	1 41 41	1 41 41	1 41 41	1 41 41	1 41 41	1 41 41	1 41 41	1 41 41	1 41 41	1 41 41
56.	3 33 36	20 37 11	2 3 58	22 39 57	1 30 50	1 30 50	1 30 50	1 30 50	1 30 50	1 30 50	1 30 50	1 30 50	1 30 50	1 30 50
58.	3 19 15	20 51 32	1 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
60.	2 2 10	21 6 37	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
62.	2 41 7	21 25 40	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
64.	2 13 41	21 57 6	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
66.	1 33 6	22 37 41	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
68.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
70.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
72.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

[illegible]

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN HEIGHT = C.	HEIGHT = C.	100. 30.	200. 30.	300. 30.	400. 30.	1000. 30.	
-C.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
1.	5 31 4	18 42 7	5 11 33	19 1 38	4 57 38	19 15 33	4 46 19	19 26 52
2.	5 28 23	18 44 48	5 6 49	19 4 22	4 54 50	19 18 21	4 43 28	19 29 43
3.	5 25 39	18 47 32	5 3 5	19 7 11	4 51 56	19 21 15	4 40 30	19 32 41
4.	5 22 52	18 50 19	5 3 5	19 10 6	4 48 55	19 24 16	4 37 24	19 35 47
5.	5 19 59	18 53 12	5 0 4	19 13 7	4 45 47	19 27 24	4 34 9	19 39 2
6.	5 17 2	18 56 5	4 56 56	19 16 15	4 42 30	19 30 41	4 30 44	19 42 27
7.	5 14 0	18 59 11	4 53 41	19 19 30	4 39 5	19 34 6	4 27 9	19 46 2
8.	5 10 52	19 2 19	4 50 18	19 22 53	4 35 29	19 37 42	4 23 22	19 49 49
9.	5 7 36	19 5 35	4 46 45	19 26 26	4 31 43	19 41 28	4 19 23	19 53 48
10.	5 4 14	19 8 57	4 43 3	19 30 8	4 27 44	19 45 27	4 15 10	19 58 1
11.	5 0 42	19 12 28	4 39 5	19 34 2	4 23 33	19 49 38	4 10 42	20 2 29
12.	4 57 2	19 16 9	4 35 3	19 38 8	4 19 6	19 54 5	4 5 57	20 7 14
13.	4 53 11	19 20 2	4 30 4	19 42 27	4 14 23	19 58 48	4 0 52	20 12 19
14.	4 49 9	19 24 2	4 26 8	19 47 3	4 9 21	20 3 50	3 55 26	20 17 45
15.	4 44 53	19 28 18	4 21 16	19 51 55	4 3 59	20 9 12	3 49 56	20 23 35
16.	4 40 22	19 32 45	4 16 4	19 57 7	3 58 12	20 14 59	3 43 17	20 29 54
17.	4 35 35	19 37 36	4 10 30	20 2 41	3 51 58	20 21 13	3 36 26	20 36 45
18.	4 30 29	19 42 42	4 4 31	20 8 40	3 45 13	20 27 58	3 28 57	20 44 14
19.	4 25 1	19 47 10	3 58 2	20 15 9	3 37 52	20 35 19	3 20 44	20 52 27
20.	4 19 8	19 54 3	3 50 59	20 22 12	3 29 47	20 43 24	3 11 38	21 1 33
21.	4 12 47	20 0 24	3 43 17	20 29 54	3 20 51	20 52 20	3 1 27	21 11 44
22.	4 5 52	20 7 19	3 34 47	20 38 24	3 10 52	21 2 19	2 49 54	21 23 17
23.	3 58 18	20 14 53	3 25 20	20 47 51	2 59 36	21 13 35	2 36 35	21 36 36
24.	3 49 58	20 23 13	3 14 43	20 58 28	2 46 39	21 26 32	2 20 53	21 52 18
25.	3 40 40	20 32 31	3 2 37	21 10 34	2 31 28	21 41 43	2 1 39	22 11 32
26.	3 30 13	20 42 58	2 48 35	21 24 36	2 13 6	22 0 5	1 36 23	22 36 48
27.	3 18 18	20 54 53	2 31 55	21 41 16	1 49 36	22 23 35	1 0 0	23 16 56
28.	2 4 30	21 8 41	2 11 19	22 1 52	1 15 31	22 57 40	0 0 0	24 0 0
29.	2 48 7	21 25 4	1 44 1	22 29 10	0 0 0	24 0 0	0 0 0	24 0 0
30.	2 28 1	21 45 10	0 59 54	23 13 17	0 0 0	24 0 0	0 0 0	24 0 0
31.	2 1 52	22 11 19	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
32.	1 23 0	22 50 11	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
33.	0 0 0	23 24 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
34.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
35.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
36.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
37.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
38.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
39.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
40.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
41.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
42.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
43.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
44.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
45.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
46.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
47.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
48.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
49.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
50.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
51.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
52.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
53.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
54.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
55.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
56.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
57.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
58.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
59.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
60.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
61.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
62.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
63.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
64.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
65.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
66.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
67.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
69.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
71.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
73.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
75.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
77.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
79.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
81.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
83.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
85.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
87.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	SCREEN	HEIGHT	DECLINATION OF SUN AT NOON	EQUATION OF TIME -C.08		14.20		1000.	
					1CC.	3CC.	2CC.	3CC.	SUNRISE	SUNSET
					SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	C	C	C	C	8 22 30	15 47 5	8 22 30	15 47 5	0 0 0	24 0 0
-86.	C	C	C	C	7 8 58	17 0 37	7 8 58	17 0 37	0 0 0	24 0 0
-84.	C	C	C	C	6 45 35	17 24 0	6 45 35	17 24 0	0 0 0	24 0 0
-82.	C	C	C	C	6 33 35	17 36 0	6 33 35	17 36 0	0 0 0	24 0 0
-80.	C	C	C	C	6 26 1	17 43 34	6 26 1	17 43 34	0 0 0	24 0 0
-78.	C	C	C	C	6 20 39	17 48 56	6 20 39	17 48 56	0 0 0	24 0 0
-76.	C	C	C	C	6 16 32	17 53 3	6 16 32	17 53 3	0 0 0	24 0 0
-74.	C	C	C	C	6 12 11	17 56 24	6 12 11	17 56 24	0 0 0	24 0 0
-72.	C	C	C	C	6 10 22	17 59 13	6 10 22	17 59 13	0 0 0	24 0 0
-70.	C	C	C	C	6 7 54	18 1 41	6 7 54	18 1 41	0 0 0	24 0 0
-68.	C	C	C	C	6 5 42	18 3 53	6 5 42	18 3 53	0 0 0	24 0 0
-66.	C	C	C	C	6 3 41	18 5 54	6 3 41	18 5 54	0 0 0	24 0 0
-64.	C	C	C	C	6 1 48	18 7 47	6 1 48	18 7 47	0 0 0	24 0 0
-62.	C	C	C	C	6 0 3	18 9 32	6 0 3	18 9 32	0 0 0	24 0 0
-60.	C	C	C	C	5 58 22	18 11 13	5 58 22	18 11 13	0 0 0	24 0 0
-58.	C	C	C	C	5 56 46	18 12 49	5 56 46	18 12 49	0 0 0	24 0 0
-56.	C	C	C	C	5 55 13	18 14 22	5 55 13	18 14 22	0 0 0	24 0 0
-54.	C	C	C	C	5 53 42	18 15 53	5 53 42	18 15 53	0 0 0	24 0 0
-52.	C	C	C	C	5 52 13	18 17 22	5 52 13	18 17 22	0 0 0	24 0 0
-50.	C	C	C	C	5 50 46	18 18 49	5 50 46	18 18 49	0 0 0	24 0 0
-48.	C	C	C	C	5 49 20	18 20 15	5 49 20	18 20 15	0 0 0	24 0 0
-46.	C	C	C	C	5 47 55	18 21 40	5 47 55	18 21 40	0 0 0	24 0 0
-44.	C	C	C	C	5 46 30	18 23 5	5 46 30	18 23 5	0 0 0	24 0 0
-42.	C	C	C	C	5 45 5	18 24 30	5 45 5	18 24 30	0 0 0	24 0 0
-40.	C	C	C	C	5 44 16	18 25 55	5 44 16	18 25 55	0 0 0	24 0 0
-38.	C	C	C	C	5 42 50	18 27 19	5 42 50	18 27 19	0 0 0	24 0 0
-36.	C	C	C	C	5 41 24	18 28 45	5 41 24	18 28 45	0 0 0	24 0 0
-34.	C	C	C	C	5 39 58	18 30 11	5 39 58	18 30 11	0 0 0	24 0 0
-32.	C	C	C	C	5 38 32	18 31 37	5 38 32	18 31 37	0 0 0	24 0 0
-30.	C	C	C	C	5 37 5	18 33 3	5 37 5	18 33 3	0 0 0	24 0 0
-28.	C	C	C	C	5 36 30	18 34 33	5 36 30	18 34 33	0 0 0	24 0 0
-26.	C	C	C	C	5 35 2	18 35 34	5 35 2	18 35 34	0 0 0	24 0 0
-24.	C	C	C	C	5 34 28	18 36 3	5 34 28	18 36 3	0 0 0	24 0 0
-22.	C	C	C	C	5 33 1	18 37 34	5 33 1	18 37 34	0 0 0	24 0 0
-20.	C	C	C	C	5 32 1	18 38 39	5 32 1	18 38 39	0 0 0	24 0 0
-18.	C	C	C	C	5 31 2	18 39 7	5 31 2	18 39 7	0 0 0	24 0 0
-16.	C	C	C	C	5 30 28	18 40 41	5 30 28	18 40 41	0 0 0	24 0 0
-14.	C	C	C	C	5 29 54	18 41 18	5 29 54	18 41 18	0 0 0	24 0 0
-12.	C	C	C	C	5 29 29	18 42 18	5 29 29	18 42 18	0 0 0	24 0 0
-10.	C	C	C	C	5 28 55	18 43 56	5 28 55	18 43 56	0 0 0	24 0 0
-8.	C	C	C	C	5 28 21	18 45 37	5 28 21	18 45 37	0 0 0	24 0 0
-6.	C	C	C	C	5 27 47	18 47 20	5 27 47	18 47 20	0 0 0	24 0 0
-4.	C	C	C	C	5 27 13	18 49 6	5 27 13	18 49 6	0 0 0	24 0 0
-2.	C	C	C	C	5 26 39	18 50 54	5 26 39	18 50 54	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	6 1 21	18 8 14	5 29 59	18 35 36	5 10 52	18 58 43	4 57 14	19 12 21	4 46 10	19 23 25	4 1 44	20 7 51
2.	5 59 20	18 10 15	5 27 54	18 41 41	5 8 43	19 0 50	4 55 4	19 14 31	4 43 58	19 25 37	3 59 17	20 10 18
4.	5 57 17	18 12 18	5 25 47	18 43 48	5 6 33	19 3 2	4 52 49	19 16 46	4 41 39	19 27 56	3 56 39	20 12 56
6.	5 55 14	18 14 21	5 23 36	18 45 59	5 4 16	19 5 19	4 50 27	19 19 8	4 39 13	19 30 22	3 53 48	20 15 47
8.	5 53 10	18 16 25	5 21 22	18 48 13	5 1 54	19 7 41	4 47 59	19 21 36	4 36 39	19 32 56	3 50 45	20 18 50
10.	5 51 4	18 18 31	5 19 3	18 50 32	4 59 26	19 10 9	4 45 23	19 24 12	4 33 56	19 35 39	3 47 27	20 22 8
12.	5 48 56	18 20 35	5 16 39	18 52 56	4 56 51	19 12 44	4 42 39	19 26 56	4 31 4	19 38 31	3 43 54	20 25 41
14.	5 46 46	18 22 49	5 14 11	18 55 24	4 54 9	19 15 26	4 39 47	19 29 48	4 28 2	19 41 33	3 40 5	20 29 30
16.	5 44 34	18 25 1	5 11 37	18 57 58	4 51 20	19 18 15	4 36 45	19 32 50	4 24 50	19 44 45	3 35 58	20 33 37
18.	5 42 18	18 27 17	5 8 56	19 0 35	4 48 22	19 21 13	4 33 33	19 36 2	4 21 26	19 48 9	3 31 31	20 38 4
20.	5 39 59	18 29 36	5 6 18	19 3 27	4 45 14	19 24 21	4 30 10	19 39 25	4 17 49	19 51 46	3 26 41	20 42 54
22.	5 37 35	18 32 0	5 3 13	19 6 22	4 41 57	19 27 38	4 26 34	19 43 1	4 13 57	19 55 38	3 21 26	20 48 9
24.	5 35 8	18 34 27	5 0 9	19 9 26	4 38 28	19 31 7	4 22 45	19 46 50	4 9 50	19 59 45	3 15 44	20 53 51
26.	5 32 25	18 37 0	4 56 56	19 12 39	4 34 46	19 34 49	4 18 41	19 50 54	4 5 25	20 4 10	3 9 28	21 0 7
28.	5 29 56	18 39 39	4 53 32	19 16 3	4 30 50	19 38 45	4 14 19	19 55 16	4 0 41	20 8 54	2 54 59	21 14 56
30.	5 27 10	18 42 25	4 49 56	19 19 39	4 26 39	19 42 56	4 9 39	19 59 56	3 55 34	20 14 1	2 52 5	21 19 30
32.	5 24 17	18 45 18	4 46 7	19 23 28	4 22 5	19 47 26	4 4 37	20 4 58	3 50 2	20 19 33	2 46 29	21 23 6
34.	5 21 16	18 48 19	4 42 4	19 27 31	4 17 20	19 52 15	3 59 10	20 10 25	3 44 1	20 25 34	2 36 55	21 32 40
36.	5 18 5	18 51 30	4 37 43	19 31 52	4 12 8	19 57 27	3 53 15	20 16 20	3 37 26	20 32 9	2 26 0	21 43 35
38.	5 14 44	18 54 51	4 33 3	19 36 32	4 6 30	20 3 5	3 46 48	20 22 47	3 30 12	20 39 23	2 13 20	21 56 15
40.	5 11 9	18 58 26	4 28 1	19 41 34	4 0 22	20 9 13	3 39 43	20 29 52	3 22 13	20 47 22	1 58 12	22 11 23
42.	5 7 21	19 2 14	4 22 33	19 47 2	3 53 38	20 15 57	3 31 53	20 37 42	3 13 17	20 56 18	1 39 19	22 30 16
44.	5 3 17	19 6 18	4 16 36	19 52 59	3 46 14	20 23 21	3 23 10	20 46 25	3 3 14	21 6 21	1 13 28	22 56 7
46.	4 58 53	19 10 42	4 10 5	19 59 30	3 38 0	20 31 35	3 13 21	20 56 14	2 51 45	21 17 50	0 0 0	23 51 42
48.	4 54 8	19 15 27	4 2 53	20 6 42	3 28 46	20 40 49	3 2 10	21 7 25	2 38 24	21 31 11	0 0 0	24 0 0
50.	4 48 58	19 20 37	3 54 53	20 14 42	3 18 18	20 51 17	2 49 13	21 20 22	2 22 31	21 47 4	0 0 0	24 0 0
52.	4 43 17	19 26 18	3 45 53	20 23 42	3 6 16	21 3 19	2 33 54	21 35 41	2 2 53	22 6 42	0 0 0	24 0 0
54.	4 37 0	19 32 35	3 35 40	20 33 55	2 52 12	21 17 23	2 15 10	21 54 25	1 36 49	22 32 46	0 0 0	24 0 0
56.	4 30 0	19 39 35	3 23 55	20 45 40	2 35 17	21 34 18	1 50 57	22 18 38	0 54 29	23 15 6	0 0 0	24 0 0
58.	4 22 6	19 47 29	3 10 7	20 59 28	2 14 10	21 55 25	1 15 14	22 54 21	0 0 0	24 0 0	0 0 0	24 0 0
60.	4 13 7	19 56 28	2 53 34	21 16 1	1 45 46	22 23 49	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
62.	4 2 43	20 6 52	2 32 58	21 36 37	0 0 0	23 10 52	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
64.	3 50 30	20 19 5	2 2 44	22 3 51	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
66.	3 35 50	20 33 45	0 0 0	22 45 13	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	3 17 40	20 51 55	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	2 54 12	21 15 23	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	2 21 32	21 48 3	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	1 26 44	22 42 51	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	63	9	1	DECLINATION OF SUN AT NOON	8.45	EQUATION OF TIME -0.01	300.	400.	1000.
LAT	SUNRISE	SUNSET	HEIGHT = C.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-86.	6 1 36	17 55 35	C	C	C	0	0	0	0
-86.	6 0 12	18 0 59	C	C	C	0	0	0	0
-84.	5 59 21	18 1 50	C	2 38 20	21 22 51	0	0	0	0
-82.	5 58 37	18 2 34	C	3 37 25	20 23 42	0	0	0	0
-80.	5 57 56	18 3 15	C	4 36 30	19 24 33	0	0	0	0
-78.	5 57 17	18 3 54	C	4 26 16	19 25 55	3 12 10	20 49	0	0
-76.	5 56 39	18 4 32	C	4 38 55	19 22 12	3 38 29	20 22 42	0	0
-74.	5 56 1	18 5 10	C	4 48 9	19 13 2	3 56 38	20 4 33	0	0
-72.	5 55 23	18 5 48	C	4 55 2	19 6 9	4 9 58	19 51 13	0	0
-70.	5 54 45	18 6 26	C	5 0 20	19 0 51	4 20 10	19 41 1	0	0
-68.	5 54 7	18 7 4	C	5 4 31	18 56 40	4 28 11	19 33 0	0	0
-66.	5 53 29	18 7 42	C	5 7 51	18 53 20	4 34 38	19 26 33	0	0
-64.	5 52 13	18 8 58	C	5 12 44	18 48 27	4 44 13	19 16 58	0	0
-62.	5 51 35	18 9 36	C	5 14 31	18 46 40	4 47 50	19 13 21	0	0
-60.	5 50 56	18 10 15	C	5 15 59	18 45 12	4 50 52	19 10 19	0	0
-58.	5 50 17	18 10 54	C	5 17 16	18 44 1	4 53 25	19 7 46	0	0
-56.	5 49 37	18 11 34	C	5 18 53	18 42 18	4 55 34	19 5 37	0	0
-54.	5 48 57	18 12 14	C	5 19 29	18 41 42	4 57 23	19 3 48	0	0
-52.	5 48 17	18 12 54	C	5 19 56	18 41 15	4 58 54	19 2 17	0	0
-50.	5 47 36	18 13 35	C	5 20 15	18 40 56	5 0 11	19 1 0	0	0
-48.	5 46 54	18 14 17	C	5 20 28	18 40 43	5 2 7	18 59 4	0	0
-46.	5 46 12	18 14 59	C	5 20 35	18 40 36	5 2 50	18 58 21	0	0
-44.	5 45 30	18 15 41	C	5 20 36	18 40 35	5 3 23	18 57 48	0	0
-42.	5 44 47	18 16 24	C	5 20 32	18 40 39	5 3 48	18 57 23	0	0
-40.	5 44 3	18 17 8	C	5 20 24	18 40 47	5 4 6	18 57 5	0	0
-38.	5 43 18	18 17 53	C	5 20 11	18 41 0	5 4 17	18 56 54	0	0
-36.	5 42 32	18 18 39	C	5 19 54	18 41 17	5 4 21	18 56 50	0	0
-34.	5 41 46	18 19 25	C	5 19 34	18 41 37	5 4 26	18 56 51	0	0
-32.	5 40 59	18 20 12	C	5 19 10	18 42 1	5 4 13	18 56 58	0	0
-30.	5 39 21	18 21 50	C	5 18 42	18 42 29	5 3 44	18 57 27	0	0
-28.	5 38 31	18 22 40	C	5 18 11	18 43 30	5 3 22	18 57 49	0	0
-26.	5 37 39	18 23 32	C	5 17 37	18 44 11	5 2 56	18 58 15	0	0
-24.	5 36 46	18 24 25	C	5 17 0	18 44 52	5 2 25	18 58 46	0	0
-22.	5 35 52	18 25 19	C	5 16 19	18 45 36	5 1 50	18 59 21	0	0
-20.	5 34 56	18 26 15	C	5 15 35	18 46 23	5 1 10	19 0 1	0	0
-18.	5 33 59	18 27 12	C	5 14 48	18 47 13	5 0 26	19 0 45	0	0
-16.	5 33 1	18 28 10	C	5 13 5	18 48 6	4 59 37	19 1 34	0	0
-14.	5 32 0	18 29 11	C	5 12 8	18 49 3	4 57 46	19 2 27	0	0
-12.	5 30 58	18 30 13	C	5 11 8	18 50 3	4 56 44	19 4 27	0	0
-10.	5 29 54	18 31 17	C	5 10 4	18 51 7	4 55 37	19 5 34	0	0
-8.	5 28 48	18 32 23	C	5 8 57	18 52 14	4 55 37	19 5 34	0	0
-6.	5 27 39	18 33 32	C	5 7 51	18 53 20	4 55 37	19 5 34	0	0
-4.	5 26 46	18 34 43	C	5 6 54	18 54 36	4 55 37	19 5 34	0	0
-2.	5 25 58	18 35 58	C	5 5 58	18 55 53	4 55 37	19 5 34	0	0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 57 13	18 3 58	5 26 29	18 34 42	5 7 46	18 53 25	4 54 25	19 6 46	4 42 36	19 17 35	4 0 14	20 0 57
2.	5 56 2	18 5 9	5 25 15	18 35 56	5 6 30	18 54 41	4 53 8	19 8 3	4 42 18	19 18 53	3 58 47	20 2 4
4.	5 54 50	18 6 21	5 23 59	18 37 12	5 5 11	18 56 0	4 51 46	19 9 25	4 40 53	19 20 18	3 57 9	20 4 2
6.	5 53 37	18 7 34	5 22 40	18 38 31	5 3 47	18 57 24	4 50 18	19 10 53	4 39 21	19 21 50	3 55 20	20 5 51
8.	5 52 24	18 8 47	5 21 17	18 39 54	5 2 18	18 58 53	4 48 44	19 12 27	4 37 43	19 23 28	3 53 21	20 7 50
10.	5 51 10	18 10 1	5 19 52	18 41 19	5 0 44	19 0 27	4 47 4	19 14 7	4 35 58	19 25 13	3 51 9	20 10 2
12.	5 49 54	18 11 17	5 18 22	18 42 49	4 59 5	19 2 6	4 45 18	19 15 53	4 34 5	19 27 6	3 48 44	20 12 27
14.	5 48 38	18 12 33	5 16 48	18 44 23	4 57 20	19 3 51	4 43 24	19 17 47	4 32 3	19 29 8	3 46 6	20 15 5
16.	5 47 19	18 13 52	5 15 10	18 46 1	4 55 25	19 5 42	4 41 23	19 19 48	4 29 53	19 31 18	3 43 13	20 17 58
18.	5 45 59	18 15 12	5 13 31	18 47 44	4 53 31	19 7 40	4 39 13	19 21 58	4 27 34	19 33 37	3 40 5	20 21 6
20.	5 44 36	18 16 35	5 11 39	18 49 32	4 51 26	19 9 45	4 36 55	19 24 16	4 25 4	19 36 7	3 36 39	20 24 32
22.	5 43 11	18 18 0	5 9 46	18 51 25	4 49 13	19 11 58	4 34 26	19 26 45	4 22 23	19 38 48	3 32 54	20 28 17
24.	5 41 43	18 19 28	5 7 46	18 53 25	4 46 51	19 14 20	4 31 48	19 29 23	4 19 29	19 41 42	3 28 49	20 32 22
26.	5 40 13	18 20 58	5 5 39	18 55 32	4 44 19	19 16 52	4 28 58	19 32 13	4 16 23	19 44 48	3 24 19	20 36 52
28.	5 38 38	18 22 33	5 3 24	18 57 47	4 41 38	19 19 33	4 25 55	19 35 16	4 13 1	19 48 10	3 19 24	20 41 10
30.	5 37 0	18 24 11	5 1 19	19 0 10	4 38 44	19 22 27	4 22 38	19 38 33	4 9 23	19 51 48	3 13 58	20 47 13
32.	5 35 18	18 25 53	4 58 29	19 2 42	4 35 38	19 25 23	4 19 5	19 42 6	4 5 27	19 55 44	3 7 58	20 53 13
34.	5 33 30	18 27 41	4 55 46	19 5 25	4 32 18	19 28 53	4 15 15	19 45 56	4 1 10	20 0 1	3 1 18	20 59 53
36.	5 31 37	18 29 34	4 52 52	19 8 19	4 28 41	19 32 30	4 11 5	19 50 6	3 56 30	20 4 41	2 53 51	21 7 20
38.	5 29 37	18 31 34	4 49 44	19 11 27	4 24 46	19 36 25	4 6 32	19 54 39	3 51 23	20 9 48	2 45 27	21 15 44
40.	5 27 31	18 33 40	4 46 22	19 14 49	4 20 31	19 40 40	4 1 34	19 59 37	3 45 45	20 15 26	2 35 53	21 25 18
42.	5 25 16	18 35 55	4 42 42	19 18 29	4 15 52	19 50 25	3 50 6	20 11 8	3 39 32	20 21 39	2 24 51	21 36 20
44.	5 22 52	18 38 19	4 38 44	19 22 27	4 10 46	19 50 25	3 43 20	20 17 51	3 32 37	20 28 34	2 11 52	21 49 19
46.	5 20 17	18 40 54	4 34 23	19 26 48	4 5 8	19 56 3	3 35 6	20 25 22	3 24 52	20 36 19	1 56 10	22 5 1
48.	5 17 30	18 43 41	4 29 37	19 31 34	3 58 53	20 2 18	3 35 49	20 33 51	3 16 7	20 45 4	1 36 13	22 24 58
50.	5 14 28	18 46 43	4 24 20	19 36 51	3 51 54	20 9 17	3 27 20	20 38 33	3 6 7	20 55 4	1 8 5	22 53 6
52.	5 11 10	18 50 1	4 18 28	19 42 43	3 44 1	20 17 10	3 17 38	20 43 33	2 54 32	21 6 39	0 0 0	24 0 0
54.	5 7 32	18 53 39	4 11 52	19 49 19	3 35 3	20 26 8	3 6 26	20 54 45	2 40 52	21 20 19	0 0 0	24 0 0
56.	5 3 20	18 57 41	4 4 25	19 56 46	3 24 44	20 36 27	2 53 15	21 7 56	2 24 19	21 36 52	0 0 0	24 0 0
58.	4 59 1	19 2 10	3 55 54	20 5 17	3 12 44	20 48 31	2 37 22	21 23 49	2 35 25	21 57 46	0 0 0	24 0 0
60.	4 53 57	19 7 14	3 46 3	20 15 18	2 58 16	21 2 55	2 17 32	21 43 39	1 34 53	22 26 18	0 0 0	24 0 0
62.	4 48 11	19 13 0	3 34 28	20 26 43	2 40 35	21 20 36	1 51 10	22 10 1	1 0 44	23 16 28	0 0 0	24 0 0
64.	4 41 33	19 19 38	3 20 34	20 40 37	2 17 55	21 43 16	1 10 20	22 50 51	0 0 0	24 0 0	0 0 0	24 0 0
66.	4 33 47	19 27 24	3 3 26	20 57 45	1 46 21	22 14 50	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	4 24 33	19 36 38	2 41 28	21 19 43	0 45 12	23 11 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	4 13 20	19 47 51	1 22 19	22 38 52	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	3 59 20	20 1 51	1 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	3 41 13	20 15 58	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	3 16 27	20 44 44	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	2 39 21	21 11 50	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	1 28 41	22 32 30	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	63	5	45	DECLINATION OF SUN AT NOON	3.21	EQUATION OF TIME	300.	30.	400.	30.	500.	30.	
LAT	SCREEN HEIGHT = C.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	C	C	C	C	C	C	C	C	C	C	C	C	C
-86.	21	17	15	30	18	1	53	5	24	30	18	0	0
-84.	7	28	19	16	22	56	3	11	38	20	39	57	0
-82.	7	4	16	16	47	19	3	49	58	17	1	37	0
-80.	6	49	58	17	1	37	4	10	40	19	40	55	0
-78.	6	40	29	17	11	6	4	25	52	19	25	43	0
-76.	6	33	43	17	17	52	4	36	54	19	14	41	0
-74.	6	28	37	17	22	58	4	45	16	19	6	19	0
-72.	6	24	37	17	26	58	4	51	49	18	59	46	0
-70.	6	21	24	17	30	11	4	57	4	18	54	31	0
-68.	6	18	44	17	32	51	4	5	1	22	18	50	13
-66.	6	16	29	17	35	6	5	4	55	18	46	40	0
-64.	6	14	33	17	37	2	5	7	53	18	43	42	0
-62.	6	12	52	17	38	43	5	10	25	18	41	10	0
-60.	6	11	23	17	40	12	5	12	34	18	39	1	0
-58.	6	10	4	17	41	31	5	14	24	18	37	11	0
-56.	6	9	53	17	42	42	5	16	0	18	35	35	0
-54.	6	7	49	17	43	46	5	17	22	18	34	13	0
-52.	6	6	50	17	44	45	5	18	34	18	33	1	0
-50.	6	5	55	17	45	40	5	19	35	18	32	0	0
-48.	6	5	5	17	46	30	5	20	29	18	31	6	0
-46.	6	4	18	17	47	17	5	21	16	18	30	19	0
-44.	6	3	34	17	48	1	5	21	56	18	29	39	0
-42.	6	2	52	17	48	42	5	22	30	18	29	5	0
-40.	6	2	13	17	49	22	5	22	59	18	28	36	0
-38.	6	1	36	17	49	59	5	23	24	18	28	11	0
-36.	6	1	0	17	50	35	5	23	44	18	27	51	0
-34.	6	0	26	17	51	9	5	24	1	18	27	34	0
-32.	5	59	53	17	51	42	5	24	14	18	27	21	0
-30.	5	55	22	17	52	13	5	24	23	18	27	12	0
-28.	5	58	51	17	52	44	5	24	30	18	27	5	0
-26.	5	58	21	17	53	14	5	24	33	18	27	2	0
-24.	5	57	23	17	54	12	5	24	34	18	27	1	0
-22.	5	56	55	17	54	40	5	24	32	18	27	3	0
-20.	5	56	28	17	55	7	5	24	28	18	27	7	0
-18.	5	56	0	17	55	35	5	24	21	18	27	14	0
-16.	5	55	33	17	56	2	5	24	11	18	27	24	0
-14.	5	55	7	17	56	28	5	24	4	18	27	35	0
-12.	5	54	40	17	56	55	5	23	46	18	27	49	0
-10.	5	54	14	17	57	21	5	23	29	18	28	6	0
-8.	5	53	47	17	57	48	5	23	10	18	28	25	0
-6.	5	53	21	17	58	14	5	22	49	18	28	46	0
-4.	5	52	54	17	58	41	5	22	26	18	29	9	0
-2.	5	52	54	17	58	41	5	22	2	18	29	9	0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		1000.		400.		300.		200.		100.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 52 27	17 35 8	5 22 0	18 29 35	5 3 28	18 48 7	4 50 15	19 1 20	4 39 35	19 12 2	3 56 40	19 54 55
2.	5 52 0	17 35 35	5 21 31	18 30 4	5 3 58	18 48 37	4 49 45	19 1 26	4 39 1	19 12 34	3 56 4	19 55 31
4.	5 51 33	18 0 2	5 21 0	18 30 35	5 2 24	18 49 11	4 49 45	19 2 56	4 38 24	19 13 11	3 55 19	19 56 16
6.	5 51 5	18 0 30	5 20 26	18 31 9	5 1 47	18 49 48	4 48 28	19 3 7	4 37 41	19 13 54	3 54 23	19 57 12
8.	5 50 37	18 0 58	5 19 50	18 31 45	5 1 5	18 50 30	4 47 42	19 3 53	4 36 51	19 14 44	3 53 17	19 58 18
10.	5 50 8	18 1 27	5 19 11	18 32 24	5 0 18	18 51 17	4 46 51	19 4 44	4 35 55	19 15 40	3 52 1	19 59 34
12.	5 49 39	18 1 56	5 18 28	18 33 7	4 55 27	18 52 8	4 45 55	19 5 42	4 34 52	19 16 43	3 50 33	20 1 2
14.	5 49 9	18 2 26	5 17 42	18 33 53	4 58 32	18 53 3	4 44 50	19 6 45	4 33 42	19 17 53	3 48 53	20 2 42
16.	5 48 36	18 2 57	5 16 53	18 34 42	4 57 31	18 54 4	4 43 40	19 7 55	4 32 25	19 19 10	3 47 1	20 4 34
18.	5 48 6	18 3 29	5 16 1	18 35 34	4 56 24	18 55 11	4 42 23	19 9 12	4 31 0	19 20 35	3 44 56	20 6 39
20.	5 47 34	18 4 1	5 15 4	18 36 31	4 55 12	18 56 23	4 41 0	19 10 35	4 29 26	19 22 9	3 42 37	20 8 58
22.	5 47 0	18 4 35	5 14 3	18 37 32	4 52 54	18 57 41	4 39 28	19 12 7	4 27 43	19 23 52	3 40 2	20 11 33
24.	5 46 25	18 5 10	5 12 58	18 38 37	4 52 29	18 59 6	4 37 48	19 13 35	4 25 51	19 25 44	3 37 10	20 14 25
26.	5 45 48	18 5 47	5 11 47	18 39 48	4 50 56	19 0 39	4 36 0	19 15 35	4 23 48	19 27 47	3 34 0	20 17 35
28.	5 45 10	18 6 25	5 10 32	18 41 3	4 49 16	19 2 19	4 34 1	19 17 34	4 21 33	19 30 2	3 30 30	20 21 5
30.	5 44 31	18 7 4	5 9 10	18 42 25	4 47 27	19 4 8	4 31 51	19 19 44	4 19 6	19 32 29	3 26 37	20 24 58
32.	5 43 49	18 7 46	5 7 42	18 43 53	4 45 25	19 6 6	4 29 30	19 22 5	4 16 25	19 35 10	3 22 19	20 29 16
34.	5 43 5	18 8 30	5 6 7	18 45 28	4 43 1	19 8 14	4 26 56	19 24 39	4 13 29	19 38 6	3 17 33	20 34 2
36.	5 41 30	18 9 0	5 4 24	18 47 11	4 41 0	19 10 35	4 24 7	19 27 28	4 10 15	19 41 20	3 12 13	20 39 22
38.	5 39 38	18 10 57	5 3 32	18 49 3	4 38 27	19 13 8	4 21 2	19 30 33	4 6 42	19 44 53	3 6 15	20 45 20
40.	5 39 43	18 11 52	5 3 0	18 51 4	4 35 40	19 15 55	4 17 39	19 33 56	4 2 47	19 48 48	2 59 33	20 52 2
42.	5 38 43	18 12 52	4 55 53	18 55 42	4 32 36	19 18 59	4 13 54	19 37 41	3 58 27	19 53 8	2 51 58	20 59 37
44.	5 37 40	18 13 55	4 53 14	18 58 21	4 29 13	19 22 22	4 9 46	19 41 49	3 53 38	19 57 57	2 43 18	21 8 17
46.	5 36 30	18 15 5	4 50 18	19 1 17	4 26 25	19 26 6	4 5 10	19 46 25	3 48 15	20 3 20	2 33 17	21 18 18
48.	5 35 15	18 16 20	4 47 4	19 4 31	4 23 20	19 30 15	4 0 3	19 51 32	3 42 14	20 9 21	2 21 32	21 30 3
50.	5 33 53	18 17 42	4 43 27	19 8 8	4 16 42	19 34 53	3 54 17	19 57 18	3 35 25	20 16 10	2 7 26	21 44 9
52.	5 32 23	18 19 12	4 39 24	19 12 11	4 11 31	19 40 4	3 47 47	20 3 48	3 32 7	20 23 54	1 49 57	22 1 38
54.	5 30 43	18 20 52	4 34 51	19 16 44	4 5 39	19 45 56	3 40 22	20 11 13	3 18 46	20 32 49	1 26 49	22 24 46
56.	5 28 52	18 22 43	4 29 40	19 21 55	3 58 58	19 52 37	3 31 51	20 19 44	3 8 24	20 43 11	0 50 49	23 0 46
58.	5 26 47	18 24 48	4 23 44	19 27 51	3 51 17	20 0 18	3 21 56	20 29 39	2 56 9	20 55 26	0 0 0	24 0 0
60.	5 24 25	18 27 10	4 16 51	19 34 44	3 42 22	20 9 13	3 10 12	20 41 23	2 41 20	21 10 15	0 0 0	24 0 0
62.	5 21 42	18 29 53	4 8 47	19 42 48	3 31 50	20 19 45	2 56 32	21 55 32	2 22 52	21 28 43	0 0 0	24 0 0
64.	5 18 33	18 33 2	3 59 10	19 52 25	3 19 12	20 32 23	2 38 29	21 13 6	1 58 33	21 53 2	0 0 0	24 0 0
66.	5 14 51	18 36 44	3 47 30	20 4 4	2 43 49	21 7 46	1 43 24	22 8 11	1 22 46	22 28 49	0 0 0	24 0 0
68.	5 10 26	18 41 9	3 32 58	20 18 37	2 17 5	21 34 30	0 43 5	23 8 30	0 0 0	24 0 0	0 0 0	24 0 0
70.	5 5 1	18 46 34	3 14 13	20 37 22	1 36 27	22 15 8	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	4 58 16	18 53 19	2 48 43	21 2 52	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	4 49 32	19 2 3	2 30 29	21 41 6	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	4 37 47	19 12 48	2 10 51	22 59 56	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	4 21 1	19 30 34	1 50 50	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	3 54 50	20 44 55	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	3 36 40	20 44 55	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	3 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	63 10	1	DECLINATION OF SUN AT NOON	-3.01	EQUATION OF TIME	0.17	400. 30.	1000. 30.
LAT	SCREEN HEIGHT = C.	HEIGHT = C.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-72.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-70.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-68.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-66.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-64.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-62.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-60.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-58.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-56.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-54.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-52.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-50.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-48.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-46.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-44.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-42.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-40.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-38.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-36.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-34.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-32.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-30.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-28.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-26.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-24.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-22.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-20.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-18.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-16.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-14.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-12.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-10.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-8.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-6.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-4.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		500.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 46 27	17 53 8	5 16 0	18 23 35	4 57 28	18 42 7	4 44 16	18 55 19	4 33 34	19 6 1	3 50 42	19 48 53
2.	5 46 52	17 52 43	5 16 24	18 23 11	4 57 52	18 41 43	4 44 40	18 54 55	4 33 58	19 5 37	3 51 1	19 48 39
4.	5 47 17	17 52 18	5 16 46	18 22 49	4 58 16	18 41 23	4 45 9	18 54 36	4 34 16	19 5 19	3 51 21	19 48 14
6.	5 47 42	17 51 53	5 17 6	18 22 29	4 58 29	18 41 6	4 45 13	18 54 22	4 34 28	19 5 7	3 51 26	19 48 9
8.	5 48 7	17 51 28	5 17 23	18 22 12	4 58 41	18 40 54	4 45 26	18 54 13	4 34 39	19 5 1	3 51 27	19 48 13
10.	5 48 32	17 51 3	5 17 37	18 21 52	4 58 50	18 40 45	4 45 35	18 54 9	4 34 48	19 5 0	3 51 22	19 48 38
12.	5 48 56	17 50 39	5 17 50	18 21 45	4 59 4	18 40 41	4 45 48	18 54 9	4 34 56	19 5 5	3 50 43	19 48 52
14.	5 49 21	17 50 14	5 18 0	18 21 35	4 59 55	18 40 40	4 45 20	18 54 15	4 34 19	19 5 16	3 50 9	19 49 26
16.	5 49 47	17 49 48	5 18 7	18 21 28	4 59 52	18 40 43	4 45 9	18 54 26	4 34 2	19 5 33	3 49 24	19 50 11
18.	5 50 12	17 49 23	5 18 12	18 21 23	4 59 45	18 40 50	4 44 53	18 54 42	4 33 38	19 5 57	3 48 27	19 51 8
20.	5 50 38	17 48 57	5 18 15	18 21 20	4 59 33	18 41 2	4 44 31	18 55 4	4 33 7	19 6 28	3 47 19	19 52 16
22.	5 51 4	17 48 31	5 18 15	18 21 20	4 59 17	18 41 18	4 44 3	18 55 32	4 32 30	19 7 5	3 45 59	19 53 36
24.	5 51 30	17 48 5	5 18 12	18 21 23	4 57 56	18 41 39	4 43 29	18 56 6	4 31 45	19 7 50	3 44 25	19 55 10
26.	5 51 57	17 47 38	5 18 7	18 21 28	4 57 30	18 42 5	4 42 48	18 56 47	4 30 52	19 8 45	3 42 37	19 56 58
28.	5 52 25	17 47 10	5 17 58	18 21 37	4 56 55	18 42 36	4 42 1	18 57 34	4 29 50	19 9 45	3 40 34	19 59 1
30.	5 52 54	17 46 41	5 17 46	18 21 49	4 56 22	18 43 13	4 41 5	18 58 33	4 28 39	19 10 56	3 38 14	20 1 21
32.	5 53 23	17 46 12	5 17 31	18 22 4	4 55 39	18 44 56	4 40 2	18 59 33	4 27 19	19 12 16	3 35 35	20 4 0
34.	5 53 54	17 45 41	5 17 12	18 22 23	4 54 55	19 44 45	4 38 50	19 0 45	4 25 47	19 13 48	3 32 36	20 6 59
36.	5 54 25	17 45 10	5 16 49	18 22 46	4 53 53	18 45 42	4 37 27	19 3 8	4 24 4	19 15 31	3 29 14	20 10 21
38.	5 54 58	17 44 37	5 16 32	18 23 13	4 53 48	18 46 47	4 35 55	19 3 25	4 22 7	19 17 28	3 25 26	20 14 9
40.	5 55 33	17 44 2	5 15 50	18 23 45	4 51 34	18 48 1	4 34 10	19 3 25	4 19 56	19 19 39	3 21 8	20 18 27
42.	5 56 9	17 43 26	5 15 12	18 24 23	4 50 11	18 49 24	4 32 12	19 7 23	4 17 28	19 22 7	3 16 17	20 23 8
44.	5 56 47	17 42 48	5 14 29	18 25 6	4 48 36	18 50 59	4 29 58	19 9 37	4 14 42	19 24 53	3 10 46	20 28 49
46.	5 57 28	17 42 7	5 13 39	18 25 56	4 46 49	18 52 46	4 27 28	19 12 7	4 11 34	19 28 1	3 4 28	20 35 7
48.	5 58 11	17 41 24	5 12 42	18 26 53	4 44 47	18 54 48	4 24 38	19 14 57	4 8 2	19 31 33	2 57 15	20 42 20
50.	5 58 58	17 40 37	5 11 36	18 27 59	4 42 30	18 57 5	4 21 26	19 18 9	4 4 1	19 35 34	2 48 54	20 50 41
52.	5 59 48	17 39 47	5 10 20	18 29 15	4 39 53	18 59 42	4 17 47	19 21 48	3 59 27	19 40 8	2 39 7	21 0 28
54.	6 0 42	17 38 53	5 8 53	18 30 42	4 36 55	19 2 40	4 13 37	19 25 58	3 54 14	19 45 21	2 27 30	21 12 5
56.	6 1 42	17 37 53	5 7 12	18 32 23	4 33 50	19 6 5	4 8 50	19 30 45	3 48 13	19 51 22	2 13 23	21 26 12
58.	6 2 47	17 36 48	5 5 16	18 34 19	4 29 34	19 10 1	4 3 19	19 36 16	3 41 14	19 58 21	1 55 40	21 43 35
60.	6 4 0	17 35 35	5 3 0	18 36 35	4 25 0	19 14 35	3 56 33	19 42 42	3 33 2	20 6 33	1 32 5	22 7 30
62.	6 5 22	17 34 13	5 0 22	18 39 13	4 19 40	19 19 55	3 49 18	19 53 17	3 23 17	20 16 18	0 55 48	22 43 47
64.	6 6 54	17 32 41	4 57 14	18 42 21	4 13 22	19 26 13	3 40 16	19 59 19	3 11 31	20 28 4	0 0 0	24 0 0
66.	6 8 40	17 30 55	4 53 31	18 46 4	4 5 48	19 33 47	3 29 19	20 10 16	2 56 58	20 42 37	0 0 0	24 0 0
68.	6 10 44	17 28 51	4 49 2	18 50 33	3 56 37	19 42 58	3 15 44	20 23 51	2 38 22	21 1 13	0 0 0	24 0 0
70.	6 13 11	17 26 24	4 43 33	18 56 2	3 45 12	19 54 23	2 58 23	20 41 12	2 13 21	21 26 14	0 0 0	24 0 0
72.	6 16 8	17 23 27	4 36 42	19 2 53	3 30 39	20 8 56	2 35 9	21 4 26	1 35 53	22 3 42	0 0 0	24 0 0
74.	6 19 48	17 19 47	4 27 57	19 11 38	3 11 19	20 28 16	2 1 20	21 38 15	0 0 0	24 0 0	0 0 0	24 0 0
76.	6 24 28	17 15 7	4 16 24	19 23 11	2 0 46	20 55 31	0 58 57	22 40 38	0 0 0	24 0 0	0 0 0	24 0 0
78.	6 30 39	17 10 56	4 0 28	19 39 7	0 0 0	21 38 49	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	6 38 18	17 7 17	3 36 57	20 2 38	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	6 52 19	16 47 16	2 58 1	20 41 34	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	7 14 25	16 25 10	1 30 33	22 9 22	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	8 1 21	15 38 14	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.												

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	63	10	15	DECLINATION OF SUN AT NCN	-6.35	EQUATION OF TIME	G.23	2CC.	3CC.	SUNRISE	SUNSET	400.	1000.
				1CC.	3CC.	2CC.	3CC.						
				SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET		
-88.	C	C	C	C	C	C	C	C	C	C	C	C	C
-86.	C	C	C	C	C	C	C	C	C	C	C	C	C
-84.	C	C	C	C	C	C	C	C	C	C	C	C	C
-82.	C	C	C	C	C	C	C	C	C	C	C	C	C
-80.	1	20	17	22	12	6	C	C	C	C	C	C	C
-78.	2	27	57	21	4	26	C	C	C	C	C	C	C
-76.	3	4	13	20	28	10	C	C	C	C	C	C	C
-74.	3	28	33	20	3	50	C	C	C	C	C	C	C
-72.	4	0	12	19	32	11	C	C	C	C	C	C	C
-70.	4	11	15	19	21	8	C	C	C	C	C	C	C
-68.	4	28	2	19	4	21	C	C	C	C	C	C	C
-66.	4	34	36	18	37	47	C	C	C	C	C	C	C
-64.	4	40	17	18	32	6	C	C	C	C	C	C	C
-62.	4	45	18	18	47	5	C	C	C	C	C	C	C
-58.	4	49	44	18	42	35	C	C	C	C	C	C	C
-56.	4	53	42	18	38	41	C	C	C	C	C	C	C
-54.	4	57	18	18	35	5	C	C	C	C	C	C	C
-52.	5	0	34	18	31	49	C	C	C	C	C	C	C
-50.	5	6	19	18	26	4	C	C	C	C	C	C	C
-48.	5	11	24	18	21	9	C	C	C	C	C	C	C
-46.	5	15	28	18	16	50	C	C	C	C	C	C	C
-44.	5	17	31	18	14	52	C	C	C	C	C	C	C
-42.	5	19	23	18	11	14	C	C	C	C	C	C	C
-40.	5	21	3	18	5	33	C	C	C	C	C	C	C
-38.	5	22	50	18	7	55	C	C	C	C	C	C	C
-36.	5	24	18	18	6	22	C	C	C	C	C	C	C
-34.	5	26	1	18	4	53	C	C	C	C	C	C	C
-32.	5	27	30	18	3	26	C	C	C	C	C	C	C
-30.	5	30	21	18	0	40	C	C	C	C	C	C	C
-28.	5	31	43	18	0	40	C	C	C	C	C	C	C
-26.	5	33	20	17	59	21	C	C	C	C	C	C	C
-24.	5	35	36	17	56	47	C	C	C	C	C	C	C
-22.	5	38	16	17	53	33	C	C	C	C	C	C	C
-20.	5	40	3	17	44	19	C	C	C	C	C	C	C
-18.	5	42	1	17	34	19	C	C	C	C	C	C	C
-16.	5	44	1	17	23	17	C	C	C	C	C	C	C
-14.	5	46	1	17	13	7	C	C	C	C	C	C	C
-12.	5	48	1	17	3	34	C	C	C	C	C	C	C
-10.	5	50	1	17	0	26	C	C	C	C	C	C	C
-8.	5	52	1	17	0	20	C	C	C	C	C	C	C
-6.	5	54	1	17	0	14	C	C	C	C	C	C	C
-4.	5	56	1	17	0	8	C	C	C	C	C	C	C
-2.	5	58	1	17	0	2	C	C	C	C	C	C	C

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		1000.		400.		300.		200.		100.		0.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 42 49	17 45 34	5 12 5	18 20 18	4 53 22	18 39 1	4 40 2	18 52 21	4 40 2	18 52 21	4 40 2	18 52 21	4 40 2	18 52 21
2.	5 44 0	17 48 23	5 14 15	18 19 8	4 54 33	18 37 50	4 41 13	18 51 10	4 41 13	18 51 10	4 41 13	18 51 10	4 41 13	18 51 10
4.	5 45 10	17 47 13	5 16 28	18 18 0	4 55 35	18 36 44	4 42 19	18 50 4	4 42 19	18 50 4	4 42 19	18 50 4	4 42 19	18 50 4
6.	5 46 20	17 46 3	5 18 41	18 16 52	4 56 42	18 35 41	4 43 41	18 49 2	4 43 41	18 49 2	4 43 41	18 49 2	4 43 41	18 49 2
8.	5 47 31	17 44 52	5 20 54	18 15 50	4 57 41	18 34 42	4 44 17	18 48 6	4 44 17	18 48 6	4 44 17	18 48 6	4 44 17	18 48 6
10.	5 48 42	17 43 41	5 23 07	18 14 50	4 58 37	18 33 46	4 45 10	18 47 13	4 45 10	18 47 13	4 45 10	18 47 13	4 45 10	18 47 13
12.	5 49 54	17 42 29	5 25 20	18 13 51	4 59 30	18 32 53	4 46 11	18 46 26	4 46 11	18 46 26	4 46 11	18 46 26	4 46 11	18 46 26
14.	5 51 6	17 41 17	5 27 33	18 12 53	5 0 15	18 32 4	4 47 19	18 45 4	4 47 19	18 45 4	4 47 19	18 45 4	4 47 19	18 45 4
16.	5 52 30	17 40 3	5 29 46	18 11 57	5 1 5	18 31 18	4 48 24	18 44 29	4 48 24	18 44 29	4 48 24	18 44 29	4 48 24	18 44 29
18.	5 53 35	17 38 48	5 31 59	18 10 9	5 2 47	18 30 35	4 49 10	18 43 13	4 49 10	18 43 13	4 49 10	18 43 13	4 49 10	18 43 13
20.	5 54 51	17 37 22	5 34 12	18 9 17	5 4 4	18 29 56	4 49 37	18 42 57	4 49 37	18 42 57	4 49 37	18 42 57	4 49 37	18 42 57
22.	5 56 9	17 36 14	5 36 25	18 8 27	5 6 37	18 28 46	4 50 25	18 42 46	4 50 25	18 42 46	4 50 25	18 42 46	4 50 25	18 42 46
24.	5 57 29	17 34 54	5 38 38	18 7 37	5 8 50	18 27 50	4 51 16	18 42 40	4 51 16	18 42 40	4 51 16	18 42 40	4 51 16	18 42 40
26.	5 58 51	17 33 22	5 40 51	18 6 45	5 10 5	18 26 40	4 52 10	18 42 34	4 52 10	18 42 34	4 52 10	18 42 34	4 52 10	18 42 34
28.	5 60 14	17 31 54	5 43 04	18 5 59	5 12 18	18 25 52	4 53 11	18 42 28	4 53 11	18 42 28	4 53 11	18 42 28	4 53 11	18 42 28
30.	5 61 38	17 30 29	5 45 17	18 4 51	5 14 31	18 25 40	4 54 14	18 42 22	4 54 14	18 42 22	4 54 14	18 42 22	4 54 14	18 42 22
32.	5 63 02	17 28 58	5 47 30	18 3 39	5 16 44	18 24 46	4 55 19	18 42 16	4 55 19	18 42 16	4 55 19	18 42 16	4 55 19	18 42 16
34.	5 64 26	17 27 23	5 49 43	18 2 20	5 18 57	18 23 52	4 56 24	18 42 10	4 56 24	18 42 10	4 56 24	18 42 10	4 56 24	18 42 10
36.	5 65 50	17 25 53	5 51 56	18 1 0	5 21 10	18 23 40	4 57 30	18 42 4	4 57 30	18 42 4	4 57 30	18 42 4	4 57 30	18 42 4
38.	5 67 14	17 24 9	5 54 09	18 0 0	5 23 23	18 22 46	4 58 37	18 41 58	4 58 37	18 41 58	4 58 37	18 41 58	4 58 37	18 41 58
40.	5 68 38	17 22 19	5 56 22	17 58 59	5 25 36	18 21 52	4 59 43	18 41 52	4 59 43	18 41 52	4 59 43	18 41 52	4 59 43	18 41 52
42.	5 69 62	17 20 23	5 58 35	17 57 43	5 27 49	18 21 40	4 60 50	18 41 46	4 60 50	18 41 46	4 60 50	18 41 46	4 60 50	18 41 46
44.	5 70 86	17 18 19	5 60 48	17 56 29	5 29 62	18 20 46	4 61 57	18 41 40	4 61 57	18 41 40	4 61 57	18 41 40	4 61 57	18 41 40
46.	5 72 10	17 16 7	5 62 61	17 55 15	5 31 75	18 20 34	4 63 04	18 41 34	4 63 04	18 41 34	4 63 04	18 41 34	4 63 04	18 41 34
48.	5 73 34	17 14 46	5 64 74	17 54 01	5 33 88	18 19 40	4 64 11	18 41 28	4 64 11	18 41 28	4 64 11	18 41 28	4 64 11	18 41 28
50.	5 74 58	17 12 11	5 66 87	17 52 47	5 35 01	18 18 46	4 65 18	18 41 22	4 65 18	18 41 22	4 65 18	18 41 22	4 65 18	18 41 22
52.	5 76 22	17 9 58	5 68 00	17 51 33	5 37 14	18 17 52	4 66 25	18 41 16	4 66 25	18 41 16	4 66 25	18 41 16	4 66 25	18 41 16
54.	5 77 46	17 7 24	5 70 13	17 50 19	5 39 27	18 17 0	4 67 32	18 41 10	4 67 32	18 41 10	4 67 32	18 41 10	4 67 32	18 41 10
56.	5 79 10	17 4 49	5 72 26	17 49 05	5 41 40	18 16 06	4 68 39	18 41 4	4 68 39	18 41 4	4 68 39	18 41 4	4 68 39	18 41 4
58.	5 80 34	17 2 14	5 74 39	17 47 51	5 43 53	18 15 12	4 69 46	18 40 58	4 69 46	18 40 58	4 69 46	18 40 58	4 69 46	18 40 58
60.	5 81 58	16 59 22	5 76 52	17 46 37	5 46 06	18 14 18	4 70 53	18 40 52	4 70 53	18 40 52	4 70 53	18 40 52	4 70 53	18 40 52
62.	5 83 22	16 56 51	5 79 05	17 45 23	5 48 19	18 13 24	4 72 00	18 40 46	4 72 00	18 40 46	4 72 00	18 40 46	4 72 00	18 40 46
64.	5 84 46	16 54 16	5 81 18	17 44 09	5 50 32	18 12 30	4 73 07	18 40 40	4 73 07	18 40 40	4 73 07	18 40 40	4 73 07	18 40 40
66.	5 86 10	16 51 41	5 83 31	17 42 55	5 52 45	18 11 36	4 74 14	18 40 34	4 74 14	18 40 34	4 74 14	18 40 34	4 74 14	18 40 34
68.	5 87 34	16 49 10	5 85 44	17 41 41	5 54 58	18 10 42	4 75 21	18 40 28	4 75 21	18 40 28	4 75 21	18 40 28	4 75 21	18 40 28
70.	5 88 58	16 46 39	5 87 57	17 40 27	5 57 11	18 9 48	4 76 28	18 40 22	4 76 28	18 40 22	4 76 28	18 40 22	4 76 28	18 40 22
72.	5 90 22	16 44 08	5 90 10	17 39 13	5 59 24	18 8 54	4 77 35	18 40 16	4 77 35	18 40 16	4 77 35	18 40 16	4 77 35	18 40 16
74.	5 91 46	16 41 37	5 92 23	17 38 0	6 01 37	18 8 0	4 78 42	18 40 10	4 78 42	18 40 10	4 78 42	18 40 10	4 78 42	18 40 10
76.	5 93 10	16 39 06	5 94 36	17 36 46	6 03 50	18 7 6	4 79 49	18 40 4	4 79 49	18 40 4	4 79 49	18 40 4	4 79 49	18 40 4
78.	5 94 34	16 36 35	5 96 49	17 35 32	6 06 03	18 6 12	4 80 56	18 40 0	4 80 56	18 40 0	4 80 56	18 40 0	4 80 56	18 40 0
80.	5 95 58	16 34 04	5 99 02	17 34 18	6 08 16	18 5 18	4 82 03	18 39 54	4 82 03	18 39 54	4 82 03	18 39 54	4 82 03	18 39 54
82.	5 97 22	16 31 33	6 01 15	17 33 04	6 10 29	18 4 24	4 83 10	18 39 48	4 83 10	18 39 48	4 83 10	18 39 48	4 83 10	18 39 48
84.	5 98 46	16 29 02	6 03 28	17 31 50	6 12 42	18 3 30	4 84 17	18 39 42	4 84 17	18 39 42	4 84 17	18 39 42	4 84 17	18 39 42
86.	5 99 70	16 26 31	6 05 41	17 30 36	6 14 55	18 2 36	4 85 24	18 39 36	4 85 24	18 39 36	4 85 24	18 39 36	4 85 24	18 39 36
88.	6 00 94	16 24 00	6 07 54	17 29 22	6 17 08	18 1 42	4 86 31	18 39 30	4 86 31	18 39 30	4 86 31	18 39 30	4 86 31	18 39 30

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	63	11	SCREEN	HEIGHT	DECLINATION	SUNRISE	SUNSET	EQUATION	TIME	1000.	SUNRISE	SUNSET	1000.
						100.	30.			30.			30.
-88.	C	C	C	C	C	24	C	0	0	0	0	0	0
-86.	C	C	C	C	C	24	C	0	0	0	0	0	0
-84.	C	C	C	C	C	24	C	0	0	0	0	0	0
-82.	C	C	C	C	C	24	C	0	0	0	0	0	0
-80.	C	C	C	C	C	24	C	0	0	0	0	0	0
-78.	C	C	C	C	C	24	C	0	0	0	0	0	0
-76.	C	C	C	C	C	24	C	0	0	0	0	0	0
-74.	1	58	44	21	25	11	47	25	47	24	0	0	0
-72.	2	31	38	20	22	12	51	24	51	24	0	0	0
-70.	3	13	44	19	19	13	51	24	51	24	0	0	0
-68.	3	28	33	19	15	5	2	24	5	24	0	0	0
-66.	3	40	53	19	46	42	2	24	42	24	0	0	0
-64.	3	51	21	19	36	14	2	24	14	24	0	0	0
-62.	4	8	22	19	17	13	9	24	9	24	0	0	0
-58.	4	15	26	19	12	9	5	24	5	24	0	0	0
-54.	4	21	45	19	0	7	7	24	7	24	0	0	0
-50.	4	32	41	18	54	7	34	24	34	24	0	0	0
-46.	4	37	28	18	50	7	50	24	50	24	0	0	0
-42.	4	46	0	18	45	42	35	24	42	24	0	0	0
-40.	4	49	49	18	37	46	10	24	46	24	0	0	0
-38.	4	53	25	18	34	10	1	24	10	24	0	0	0
-36.	4	56	48	18	30	47	3	24	47	24	0	0	0
-34.	5	0	0	18	27	35	22	24	35	24	0	0	0
-32.	5	3	3	18	24	32	2	24	32	24	0	0	0
-30.	5	5	57	18	21	38	1	24	57	24	0	0	0
-28.	5	8	43	18	18	52	1	24	43	24	0	0	0
-26.	5	11	57	18	16	12	20	24	57	24	0	0	0
-24.	5	16	26	18	13	38	9	24	26	24	0	0	0
-22.	5	18	50	18	11	1	2	24	50	24	0	0	0
-20.	5	21	10	18	8	25	5	24	10	24	0	0	0
-18.	5	23	40	18	4	8	1	24	40	24	0	0	0
-16.	5	25	40	18	1	55	4	24	40	24	0	0	0
-14.	5	27	51	17	59	35	3	24	51	24	0	0	0
-12.	5	30	0	17	55	28	3	24	0	24	0	0	0
-10.	5	33	12	17	52	23	3	24	12	24	0	0	0
-8.	5	36	16	17	45	19	3	24	16	24	0	0	0
-6.	5	39	19	17	45	16	3	24	19	24	0	0	0
-4.	5	42	22	17	45	16	3	24	22	24	0	0	0
-2.	5	45	25	17	45	16	3	24	25	24	0	0	0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		1000.		400.		300.		200.		100.		30.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 40 21	17 47 14	5 8 59	12 18 37	4 49 51	18 37 44	4 36 13	18 51 22	4 49 51	18 37 44	4 36 13	18 51 22	4 25 9	19 2 26	3 40 41	19 46 54
2.	5 42 23	17 45 12	5 11 0	18 16 35	4 51 54	18 35 41	4 38 18	18 49 17	4 51 54	18 35 41	4 38 18	18 49 17	4 27 15	19 0 20	3 42 58	19 44 37
4.	5 44 26	17 43 9	5 13 0	18 14 35	4 53 56	18 33 41	4 40 18	18 47 17	4 53 56	18 33 41	4 40 18	18 47 17	4 29 16	18 58 19	3 45 4	19 42 31
6.	5 46 28	17 41 7	5 14 59	18 12 37	4 55 58	18 31 45	4 42 13	18 45 22	4 55 58	18 31 45	4 42 13	18 45 22	4 31 11	18 56 24	3 47 1	19 40 34
8.	5 48 31	17 39 4	5 16 54	18 10 41	4 57 43	18 29 52	4 44 4	18 43 31	4 57 43	18 29 52	4 44 4	18 43 31	4 33 0	18 54 35	3 48 48	19 38 47
10.	5 50 36	17 36 59	5 18 48	18 8 47	4 59 32	18 28 3	4 45 50	18 41 45	4 59 32	18 28 3	4 45 50	18 41 45	4 34 44	18 52 51	3 50 26	19 37 9
12.	5 52 41	17 34 54	5 20 41	18 6 54	5 1 19	18 26 16	4 47 32	18 40 3	5 1 19	18 26 16	4 47 32	18 40 3	4 36 24	18 51 11	3 51 55	19 35 40
14.	5 54 48	17 32 47	5 22 33	18 5 2	5 3 3	18 24 32	4 49 11	18 38 24	5 3 3	18 24 32	4 49 11	18 38 24	4 37 58	18 59 37	3 53 14	19 34 21
16.	5 56 58	17 30 37	5 24 25	18 3 10	5 4 44	18 22 51	4 50 46	18 36 49	5 4 44	18 22 51	4 50 46	18 36 49	4 39 28	18 48 7	3 54 25	19 33 10
18.	5 59 9	17 28 26	5 26 16	18 1 19	5 6 23	18 21 12	4 52 17	18 35 18	5 6 23	18 21 12	4 52 17	18 35 18	4 40 53	18 46 42	3 55 27	19 32 8
20.	6 1 24	17 26 11	5 28 6	17 59 29	5 8 1	18 19 34	4 53 46	18 33 49	5 8 1	18 19 34	4 53 46	18 33 49	4 42 14	18 45 21	3 56 20	19 31 15
22.	6 3 42	17 23 55	5 29 57	17 57 38	5 9 36	18 17 59	4 55 10	18 32 25	5 9 36	18 17 59	4 55 10	18 32 25	4 43 31	18 44 4	3 57 4	19 30 31
24.	6 6 3	17 21 22	5 31 48	17 55 47	5 11 10	18 16 25	4 56 52	18 31 3	5 11 10	18 16 25	4 56 52	18 31 3	4 44 43	18 42 52	3 58 4	19 29 56
26.	6 8 29	17 19 6	5 33 39	17 53 56	5 12 42	18 14 53	4 57 51	18 29 44	5 12 42	18 14 53	4 57 51	18 29 44	4 45 51	18 41 44	3 58 4	19 29 56
28.	6 11 0	17 16 35	5 35 32	17 52 3	5 14 13	18 13 22	4 59 7	18 28 28	5 14 13	18 13 22	4 59 7	18 28 28	4 46 55	18 40 40	3 58 19	19 29 16
30.	6 13 36	17 13 59	5 37 26	17 50 9	5 15 42	18 11 53	5 0 19	18 27 16	5 15 42	18 11 53	5 0 19	18 27 16	4 47 54	18 39 41	3 58 24	19 29 11
32.	6 16 19	17 11 16	5 39 21	17 48 14	5 17 11	18 10 24	5 1 29	18 26 6	5 17 11	18 10 24	5 1 29	18 26 6	4 48 49	18 38 46	3 58 17	19 29 18
34.	6 19 9	17 8 26	5 41 19	17 46 16	5 18 38	18 8 57	5 3 40	18 24 59	5 18 38	18 8 57	5 3 40	18 24 59	4 49 39	18 37 56	3 57 59	19 29 36
36.	6 22 8	17 5 27	5 43 19	17 44 16	5 20 5	18 7 30	5 5 34	18 23 55	5 20 5	18 7 30	5 5 34	18 23 55	4 50 24	18 37 11	3 57 28	19 30 7
38.	6 25 16	17 2 19	5 45 22	17 42 13	5 21 32	18 6 3	5 4 41	18 22 54	5 21 32	18 6 3	5 4 41	18 22 54	4 51 4	18 36 31	3 56 43	19 30 52
40.	6 28 34	16 59 1	5 47 29	17 40 6	5 22 58	18 4 37	5 5 59	18 21 56	5 22 58	18 4 37	5 5 59	18 21 56	4 52 32	18 35 3	3 55 43	19 31 52
42.	6 32 5	16 56 30	5 49 40	17 37 55	5 24 24	18 3 11	5 6 34	18 21 1	5 24 24	18 3 11	5 6 34	18 21 1	4 52 9	18 35 26	3 55 43	19 31 52
44.	6 35 51	16 53 45	5 51 56	17 35 39	5 25 50	18 1 45	5 7 25	18 20 10	5 25 50	18 1 45	5 7 25	18 20 10	4 52 32	18 35 3	3 52 51	19 34 44
46.	6 39 51	16 50 44	5 54 18	17 33 17	5 27 17	18 0 18	5 8 13	18 19 22	5 27 17	18 0 18	5 8 13	18 19 22	4 52 49	18 34 46	3 50 54	19 36 41
48.	6 44 11	16 47 24	5 56 47	17 30 48	5 28 44	17 58 51	5 8 57	18 18 38	5 28 44	17 58 51	5 8 57	18 18 38	4 52 58	18 34 37	3 48 34	19 39 1
50.	6 48 53	16 44 42	5 59 24	17 28 11	5 30 12	17 57 23	5 9 37	18 17 58	5 30 12	17 57 23	5 9 37	18 17 58	4 52 56	18 34 37	3 45 46	19 41 49
52.	6 54 1	16 41 34	6 2 10	17 25 25	5 31 41	17 55 54	5 10 42	18 17 23	5 31 41	17 55 54	5 10 42	18 17 23	4 52 50	18 34 45	3 42 25	19 45 10
54.	6 59 40	16 37 55	6 5 8	17 22 27	5 33 12	17 54 23	5 10 42	18 16 53	5 33 12	17 54 23	5 10 42	18 16 53	4 52 31	18 35 4	3 38 28	19 49 7
56.	7 5 56	16 34 39	6 8 20	17 19 15	5 34 45	17 52 50	5 11 7	18 16 28	5 34 45	17 52 50	5 11 7	18 16 28	4 52 0	18 35 35	3 33 45	19 53 50
58.	7 12 57	16 31 38	6 11 48	17 15 47	5 36 20	17 51 15	5 11 24	18 16 11	5 36 20	17 51 15	5 11 24	18 16 11	4 51 14	18 36 21	3 28 7	19 59 28
60.	7 20 54	16 28 41	6 15 37	17 11 58	5 38 0	17 49 35	5 11 35	18 16 0	5 38 0	17 49 35	5 11 35	18 16 0	4 50 11	18 37 24	3 21 21	20 6 14
62.	7 29 34	16 25 34	6 19 49	17 7 46	5 39 43	17 47 52	5 11 36	18 15 59	5 39 43	17 47 52	5 11 36	18 15 59	4 48 48	18 38 47	3 13 10	20 14 25
64.	7 40 37	16 22 28	6 24 33	17 3 2	5 41 33	17 46 2	5 11 26	18 16 9	5 41 33	17 46 2	5 11 26	18 16 9	4 46 59	18 40 36	3 3 6	20 24 29
66.	7 53 13	16 19 22	6 29 55	16 57 40	5 43 29	17 44 6	5 11 2	18 16 33	5 43 29	17 44 6	5 11 2	18 16 33	4 44 39	18 42 56	2 50 32	20 37 3
68.	8 8 31	16 16 14	6 36 6	16 54 11	5 45 35	17 42 0	5 10 21	18 17 14	5 45 35	17 42 0	5 10 21	18 17 14	4 43 48	18 45 55	2 34 22	20 53 13
70.	8 27 44	16 13 51	6 43 24	16 51 29	5 47 53	17 39 42	5 9 18	18 18 17	5 47 53	17 39 42	5 9 18	18 18 17	4 42 46	18 49 47	2 12 40	21 14 55
72.	8 53 7	16 11 34	6 52 11	16 48 11	5 50 29	17 37 6	5 7 45	18 19 50	5 50 29	17 37 6	5 7 45	18 19 50	4 41 40	18 54 49	1 41 1	21 46 34
74.	9 29 44	16 9 28	7 3 4	16 45 31	5 53 27	17 34 8	5 5 32	18 22 13	5 53 27	17 34 8	5 5 32	18 22 13	4 40 17	19 10 28	0 0 0	22 45 49
76.	10 38 19	16 7 16	7 17 3	16 42 32	5 56 59	17 30 36	5 2 22	18 25 13	5 56 59	17 30 36	5 2 22	18 25 13	4 39 44	19 12 58	0 0 0	24 0 0
78.	11 52 4	16 5 4	7 35 58	16 39 3	6 1 21	17 26 14	4 57 45	18 29 50	6 1 21	17 26 14	4 57 45	18 29 50	4 37 37	19 23 8	0 0 0	24 0 0
80.	13 7 44	16 3 24	8 3 32	16 36 6	6 7 4	17 23 1	4 50 48	18 36 47	6 7 4	17 23 1	4 50 48	18 36 47	3 45 37	19 41 58	0 0 0	24 0 0
82.	14 52 4	16 1 16	8 19 29	16 33 17	6 15 10	17 19 25	4 39 44	18 47 51	6 15 10	17 19 25	4 39 44	18 47 51	3 44 48	20 12 47	0 0 0	24 0 0
84.	16 52 18	16 0 0	9 52 18	16 30 17	6 28 5	16 59 30	4 20 8	19 7 27	6 28 5	16 59 30	4 20 8	19 7 27	2 13 0	21 14 35	0 0 0	24 0 0
86.	19 52 18	15 58 13	10 52 18	16 24 13	6 53 22	16 54 13	3 37 28	19 50 7	6 53 22	16 54 13	3 37 28	19 50 7	0 0 0	22 4 0	0 0 0	24 0 0
88.	22 52 18	15 51 13	13 52 18	16 17 13	8 14 19	15 13 16	0 0 0	24 0 0	8 14 19	15 13 16	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = 0.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 40 53	17 47 54	5 8 49	18 15 58	4 49 17	18 39 30	4 35 20	18 53 27	4 24 1	19 4 46	3 38 23	19 50 24
2.	5 43 32	17 45 15	5 11 29	18 17 18	4 51 59	18 36 48	4 38 4	18 50 43	4 26 47	19 2 0	3 41 24	19 47 23
4.	5 46 12	17 42 35	5 14 7	18 14 40	4 54 37	18 34 10	4 40 43	18 48 4	4 29 27	18 59 20	3 44 14	19 44 33
6.	5 48 52	17 39 55	5 16 42	18 12 5	4 57 11	18 31 36	4 43 17	18 45 30	4 32 1	18 56 46	3 46 54	19 41 53
8.	5 51 33	17 37 14	5 19 16	18 9 31	4 59 41	18 29 6	4 45 46	18 43 1	4 34 30	18 54 17	3 49 24	19 39 23
10.	5 54 15	17 34 32	5 21 48	18 6 59	5 2 9	18 26 38	4 48 11	18 40 36	4 36 53	18 51 54	3 51 44	19 37 3
12.	5 56 59	17 31 48	5 24 19	18 4 28	5 4 34	18 24 13	4 50 32	18 38 15	4 39 11	18 49 36	3 53 55	19 34 52
14.	5 59 46	17 29 1	5 26 50	18 1 57	5 6 57	18 21 50	4 52 50	18 35 57	4 41 26	18 47 21	3 55 57	19 32 50
16.	6 2 35	17 26 12	5 29 21	17 59 26	5 9 18	18 19 29	4 55 5	18 31 31	4 43 35	18 45 12	3 57 50	19 30 57
18.	6 5 27	17 23 20	5 31 52	17 56 55	5 11 37	18 17 10	4 57 16	18 31 31	4 45 41	18 43 6	3 59 35	19 29 12
20.	6 8 24	17 20 23	5 34 23	17 54 24	5 13 55	18 14 52	4 59 26	18 29 21	4 47 43	18 41 4	4 1 12	19 27 35
22.	6 11 25	17 17 22	5 36 56	17 51 51	5 16 12	18 12 35	5 1 32	18 27 15	4 49 42	18 39 5	4 2 41	19 26 6
24.	6 14 31	17 14 16	5 39 30	17 49 17	5 18 29	18 10 18	5 3 37	18 25 10	4 51 37	18 37 10	4 4 1	19 24 46
26.	6 17 42	17 11 4	5 42 6	17 46 41	5 20 45	18 8 2	5 5 39	18 23 8	4 53 29	18 35 18	4 5 12	19 23 35
28.	6 21 2	17 7 45	5 44 44	17 44 3	5 23 1	18 5 46	5 7 40	18 21 7	4 55 18	18 33 29	4 6 15	19 22 32
30.	6 24 29	17 4 18	5 47 25	17 41 22	5 25 17	18 3 30	5 9 40	18 19 7	4 57 4	18 31 43	4 7 10	19 21 37
32.	6 28 4	17 0 42	5 50 10	17 38 37	5 27 34	18 1 13	5 11 38	18 17 9	4 58 48	18 29 59	4 7 55	19 20 52
34.	6 31 50	16 56 57	5 53 0	17 35 47	5 29 53	17 58 54	5 13 36	18 15 11	5 0 29	18 28 18	4 8 30	19 20 17
36.	6 35 46	16 53 1	5 55 54	17 32 53	5 32 13	17 56 34	5 15 32	18 13 15	5 2 7	18 26 40	4 8 56	19 19 51
38.	6 39 56	16 48 51	5 58 54	17 29 53	5 34 35	17 54 12	5 17 24	18 11 18	5 3 43	18 25 4	4 9 10	19 19 37
40.	6 44 21	16 44 26	6 2 1	17 26 46	5 37 0	17 51 47	5 19 25	18 9 22	5 5 16	18 23 31	4 9 13	19 19 34
42.	6 49 3	16 39 44	6 5 16	17 23 31	5 39 26	17 49 19	5 21 21	18 7 26	5 6 47	18 22 0	4 9 3	19 19 44
44.	6 54 4	16 34 43	6 8 41	17 20 6	5 42 1	17 46 46	5 23 18	18 5 29	5 8 16	18 20 31	4 8 39	19 20 8
46.	6 59 29	16 29 18	6 12 16	17 16 31	5 44 38	17 44 9	5 25 16	18 3 31	5 9 43	18 19 4	4 8 0	19 20 47
48.	7 5 20	16 23 27	6 16 4	17 12 43	5 47 21	17 41 26	5 27 15	18 1 32	5 11 7	18 17 40	4 7 3	19 21 44
50.	7 11 43	16 17 4	6 20 7	17 8 40	5 50 11	17 38 36	5 29 16	17 59 31	5 12 29	18 16 18	4 5 46	19 23 1
52.	7 18 44	16 10 3	6 24 28	17 4 19	5 53 9	17 35 38	5 31 19	17 57 28	5 13 49	18 14 58	4 4 7	19 24 40
54.	7 26 31	16 2 16	6 29 9	16 59 38	5 56 17	17 32 30	5 33 25	17 55 22	5 15 6	18 13 41	4 2 2	19 26 45
56.	7 35 12	15 53 35	6 34 15	16 54 32	5 59 38	17 29 9	5 35 35	17 53 12	5 16 20	18 12 27	3 59 26	19 29 21
58.	7 45 3	15 43 44	6 39 52	16 48 55	6 3 13	17 25 34	5 37 50	17 50 57	5 17 32	18 11 15	3 56 14	19 32 33
60.	7 56 21	15 32 26	6 46 6	16 42 41	6 7 5	17 21 42	5 40 11	17 48 36	5 18 40	18 10 7	3 52 17	19 36 30
62.	8 9 33	15 15 14	6 53 5	16 35 42	6 11 26	17 17 27	5 42 39	17 46 8	5 19 45	18 9 2	3 47 26	19 41 21
64.	8 25 19	15 3 28	7 1 2	16 27 45	6 16 1	17 12 46	5 45 17	17 43 30	5 20 46	18 8 1	3 41 27	19 47 20
66.	8 44 43	14 44 4	7 10 13	16 18 34	6 21 18	17 7 29	5 48 6	17 40 41	5 21 42	18 7 5	3 33 59	19 54 48
68.	9 9 47	14 15 0	7 21 1	16 7 46	6 27 18	17 1 29	5 51 12	17 37 35	5 22 32	18 6 15	3 24 35	20 4 12
70.	10 25 22	12 38 25	7 34 2	15 54 45	6 34 18	16 54 29	5 54 38	17 34 9	5 23 14	18 5 33	3 12 29	20 16 18
72.	11 50 22	12 28 25	7 50 11	15 38 36	6 42 37	16 46 10	5 58 32	17 30 15	5 23 47	18 5 0	2 56 29	20 32 18
74.	13 20 22	12 18 25	8 11 4	15 17 43	6 52 48	16 35 59	6 3 4	17 25 43	5 24 6	18 4 41	2 34 18	20 54 29
76.	14 50 22	12 8 25	8 39 48	14 48 59	7 5 43	16 23 4	6 8 32	17 20 15	5 24 7	18 4 40	2 0 51	21 27 56
78.	16 20 22	11 4 35	9 24 12	14 4 35	7 22 55	16 5 52	6 15 24	17 13 23	5 23 41	18 5 6	0 56 34	22 32 13
80.	17 50 22	10 24 35	11 17 8	12 11 39	7 47 31	15 41 16	6 24 32	17 4 15	5 22 31	18 6 16	0 0 0	24 0 0
82.	19 20 22	9 4 35	13 27 8	11 1 46	8 27 1	15 1 46	6 37 41	16 51 6	5 20 5	18 8 42	0 0 0	24 0 0
84.	20 50 22	8 24 35	15 51 24	13 37 23	9 51 24	13 37 23	6 59 7	16 29 40	5 15 6	18 13 41	0 0 0	24 0 0
86.	22 20 22	7 4 35	17 24 24	12 24 35	11 24 24	12 24 35	7 42 54	15 45 53	5 3 44	18 25 3	0 0 0	24 0 0
88.	23 50 22	6 14 35	18 54 24	11 14 35	12 54 24	11 14 35	8 12 54	14 35 53	4 26 3	19 2 44	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

[illegible]

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		500.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 45 C	17 52 11	5 12 15	18 24 56	4 52 16	18 44 55	4 37 59	18 59 12	4 26 23	19 10 48	3 39 31	19 57 39
2.	5 48 12	17 48 59	5 15 27	18 21 44	4 55 31	18 41 40	4 41 17	18 55 54	4 29 44	19 10 48	3 43 12	19 53 59
4.	5 51 23	17 45 48	5 18 37	18 18 34	4 58 41	18 38 30	4 44 29	18 52 42	4 32 58	19 4 13	3 46 40	19 50 31
6.	5 54 35	17 42 36	5 21 44	18 15 27	5 1 48	18 35 23	4 47 36	18 49 35	4 36 6	19 1 5	3 49 56	19 47 15
8.	5 57 49	17 39 22	5 24 50	18 12 21	5 4 51	18 32 20	4 50 39	18 46 32	4 39 8	18 58 3	3 53 3	19 44 8
10.	6 1 4	17 36 7	5 27 55	18 9 16	5 7 52	18 29 19	4 53 37	18 43 34	4 42 5	18 55 6	3 55 59	19 41 12
12.	6 4 22	17 32 49	5 31 C	18 6 11	5 10 56	18 26 21	4 56 32	18 40 39	4 44 57	18 52 14	3 58 47	19 38 24
14.	6 7 42	17 29 29	5 34 4	18 3 7	5 13 46	18 23 25	4 59 23	18 37 48	4 47 45	18 49 26	4 1 25	19 35 46
16.	6 11 6	17 26 5	5 37 8	18 0 3	5 16 41	18 20 30	5 2 11	18 35 0	4 50 29	18 46 42	4 3 55	19 33 16
18.	6 14 34	17 22 37	5 40 13	17 56 58	5 19 34	18 17 37	5 4 57	18 32 14	4 53 9	18 44 2	4 6 16	19 30 55
20.	6 18 7	17 19 4	5 43 20	17 53 51	5 22 27	18 14 44	5 7 41	18 29 30	4 56 46	18 41 25	4 8 30	19 28 41
22.	6 21 46	17 15 25	5 46 29	17 50 42	5 25 20	18 11 51	5 10 23	18 26 48	4 58 21	18 38 50	4 10 36	19 26 35
24.	6 25 31	17 11 40	5 49 39	17 47 32	5 28 13	18 8 58	5 13 4	18 24 7	5 0 52	18 36 19	4 12 34	19 24 37
26.	6 29 23	17 7 48	5 52 54	17 44 17	5 31 6	18 6 5	5 15 44	18 21 27	5 3 22	18 33 49	4 14 24	19 22 47
28.	6 33 24	17 3 47	5 56 11	17 41 0	5 34 1	18 3 10	5 18 24	18 18 47	5 5 49	18 31 22	4 16 7	19 21 4
30.	6 37 35	16 59 30	5 59 34	17 37 37	5 36 57	18 0 14	5 21 3	18 16 8	5 8 15	18 28 56	4 17 43	19 19 28
32.	6 41 57	16 55 14	6 3 1	17 34 10	5 39 56	17 57 15	5 23 42	18 13 29	5 10 39	18 26 32	4 19 10	19 18 1
34.	6 46 31	16 50 40	6 6 35	17 30 36	5 42 58	17 54 13	5 26 23	18 10 48	5 13 3	18 24 8	4 20 30	19 16 41
36.	6 51 20	16 45 51	6 10 17	17 26 54	5 46 4	17 51 7	5 29 4	18 8 7	5 15 26	18 21 45	4 21 41	19 15 30
38.	6 56 25	16 40 46	6 14 7	17 23 4	5 49 13	17 47 58	5 31 47	18 5 24	5 17 48	18 19 23	4 22 44	19 14 27
40.	7 1 50	16 35 21	6 18 6	17 19 5	5 52 29	17 44 42	5 34 33	18 2 38	5 20 11	18 17 0	4 23 37	19 13 34
42.	7 7 36	16 29 35	6 22 17	17 14 54	5 55 50	17 41 21	5 37 12	17 59 49	5 22 34	18 14 37	4 24 21	19 12 50
44.	7 12 48	16 23 23	6 26 42	17 10 29	5 58 19	17 37 52	5 40 14	17 56 57	5 24 58	18 12 13	4 24 54	19 12 17
46.	7 20 30	16 16 41	6 31 22	17 5 49	6 2 57	17 34 14	5 43 11	17 54 0	5 27 23	18 9 48	4 25 16	19 11 55
48.	7 27 47	16 9 24	6 36 20	17 0 51	6 6 46	17 30 25	5 46 14	17 50 57	5 29 50	18 7 21	4 25 25	19 11 46
50.	7 35 47	16 1 24	6 41 40	16 55 31	6 10 47	17 26 24	5 49 24	17 47 47	5 32 20	18 4 51	4 25 20	19 11 51
52.	7 44 27	15 52 34	6 47 25	16 49 46	6 15 3	17 22 8	5 52 41	17 44 30	5 34 53	18 2 18	4 24 59	19 12 12
54.	7 54 30	15 42 41	6 53 40	16 43 31	6 19 36	17 17 35	5 56 9	17 41 2	5 37 30	17 59 41	4 24 20	19 12 51
56.	8 5 41	15 31 30	7 0 31	16 36 40	6 24 30	17 12 41	5 59 49	17 37 22	5 40 12	17 56 59	4 23 19	19 13 52
58.	8 18 22	15 18 35	7 8 7	16 29 4	6 29 50	17 7 21	6 3 43	17 33 28	5 43 1	17 54 10	4 21 54	19 15 17
60.	8 33 35	15 3 36	7 16 38	16 20 33	6 35 41	17 1 30	6 7 55	17 29 16	5 45 59	17 51 12	4 19 59	19 17 12
62.	8 51 41	14 45 30	7 26 18	16 10 53	6 42 10	16 55 1	6 12 29	17 24 42	5 49 6	17 48 5	4 17 28	19 19 43
64.	9 14 18	14 22 53	7 37 26	15 59 45	6 49 28	16 47 43	6 17 31	17 19 40	5 52 26	17 44 45	4 14 13	19 22 58
66.	9 44 33	13 52 38	7 50 31	15 46 40	6 57 47	16 39 24	6 23 8	17 14 3	5 56 3	17 41 8	4 10 2	19 27 9
68.	10 32 18	13 4 53	8 6 17	15 30 54	7 7 28	16 29 43	6 29 30	17 7 41	6 0	17 37 10	4 4 39	19 32 32
70.	C C C	24 C C	8 25 54	15 11 17	7 18 57	16 18 14	6 36 51	17 0 20	6 4 28	17 32 43	3 57 40	19 39 31
72.	C C C	24 C C	8 51 31	14 45 40	7 32 57	16 4 14	6 45 33	16 51 38	6 9 32	17 27 39	3 48 30	19 48 41
74.	C C C	24 C C	9 27 57	14 9 14	7 50 40	15 46 31	6 56 9	16 41 2	6 15 29	17 21 42	3 36 10	20 1 1
76.	C C C	24 C C	10 33 12	13 3 59	8 14 12	15 22 59	7 9 33	16 27 38	6 22 42	17 14 29	3 18 59	20 18 12
78.	C C C	24 C C	C C C	24 C C	8 48 6	14 49 5	7 27 19	16 9 52	6 31 50	17 5 21	2 53 32	20 43 39
80.	C C C	24 C C	C C C	24 C C	9 45 54	13 51 17	7 52 39	15 44 32	6 44 6	16 53 5	2 11 5	21 26 6
82.	C C C	24 C C	C C C	24 C C	C C C	24 C C	8 53 20	15 3 51	7 2	16 35 10	0 1 2	23 36 9
84.	C C C	24 C C	C C C	24 C C	C C C	24 C C	10 1 34	13 35 37	7 31 52	16 5 19	0 0 0	24 0 0
86.	C C C	24 C C	C C C	24 C C	C C C	24 C C	C C C	24 C C	8 36 49	15 0 22	0 0 0	24 0 0
88.	C C C	24 C C	C C C	24 C C	C C C	24 C C	C C C	24 C C	C C C	24 C C	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

[illegible]

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.	100.		200.		300.		400.		1000.	
			SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5 50 58	17 58 13	5 17 50	18 31 21	4 57 38	18 51 33	4 43 11	19 6 0	4 31 27	19 17 44	3 43 56	20 5 15
2.	5 54 24	17 54 47	5 21 18	18 27 53	5 1 8	18 48 3	4 46 45	19 2 26	4 35 4	19 14 7	3 47 54	20 1 17
4.	5 57 50	17 51 21	5 24 43	18 24 26	5 4 34	18 44 37	4 50 13	18 58 58	4 28 33	19 10 38	3 51 40	19 57 31
6.	6 1 18	17 47 53	5 28 5	18 21 6	5 7 56	18 41 15	4 53 35	18 55 36	4 41 57	19 7 14	3 55 15	19 53 56
8.	6 4 46	17 44 25	5 31 26	18 17 45	5 11 14	18 37 57	4 56 53	18 52 18	4 45 15	19 3 56	3 58 38	19 50 33
10.	6 8 17	17 40 54	5 34 46	18 14 25	5 14 30	18 34 41	5 0 6	18 49 5	4 48 27	19 0 44	4 1 52	19 47 19
12.	6 11 50	17 37 21	5 38 6	18 11 5	5 17 44	18 31 27	5 3 6	18 45 55	4 51 35	18 57 36	4 4 55	19 44 15
14.	6 15 26	17 33 45	5 41 25	18 7 46	5 20 55	18 28 16	5 6 23	18 42 48	4 54 38	18 54 33	4 7 50	19 41 21
16.	6 19 6	17 30 21	5 44 45	18 4 26	5 24 5	18 25 6	5 9 27	18 39 44	4 57 38	18 51 33	4 10 37	19 38 34
18.	6 22 50	17 26 21	5 48 6	18 1 5	5 27 14	18 21 57	5 12 29	18 36 42	5 0 34	18 48 37	4 13 15	19 35 56
20.	6 26 40	17 22 31	5 51 29	17 57 42	5 30 23	18 18 48	5 15 29	18 33 42	5 3 27	18 45 44	4 15 46	19 33 25
22.	6 30 37	17 18 34	5 54 54	17 54 17	5 33 32	18 15 39	5 18 27	18 30 44	5 6 18	18 42 53	4 18 9	19 31 2
24.	6 34 40	17 14 31	5 58 22	17 50 45	5 36 42	18 12 29	5 21 25	18 27 46	5 9 6	18 40 5	4 20 24	19 28 47
26.	6 38 51	17 10 20	6 1 54	17 47 17	5 39 53	18 9 18	5 24 22	18 24 49	5 11 53	18 37 18	4 22 32	19 26 39
28.	6 43 12	17 5 59	6 5 30	17 43 41	5 43 5	18 6 6	5 27 19	18 21 52	5 14 38	18 34 33	4 24 33	19 24 38
30.	6 47 43	17 1 28	6 9 12	17 39 59	5 46 20	18 2 51	5 30 16	18 18 55	5 17 22	18 31 49	4 26 27	19 22 44
32.	6 52 27	16 56 44	6 12 59	17 36 12	5 49 38	17 59 33	5 33 15	18 15 56	5 20 5	18 29 6	4 28 14	19 20 57
34.	6 57 25	16 51 46	6 16 54	17 32 14	5 53 0	17 56 11	5 36 15	18 12 54	5 22 48	18 26 23	4 29 53	19 19 18
36.	7 2 38	16 46 33	6 20 57	17 28 17	5 56 27	17 52 44	5 39 17	18 9 54	5 25 31	18 23 40	4 31 25	19 17 46
38.	7 8 10	16 41 1	6 25 10	17 24 1	5 59 59	17 49 12	5 42 22	18 6 49	5 28 15	18 20 56	4 32 49	19 16 22
40.	7 14 3	16 36 3	6 29 35	17 19 36	6 3 37	17 45 34	5 45 30	18 3 41	5 31 0	18 18 11	4 34 6	19 15 5
42.	7 20 21	16 31 50	6 34 12	17 14 59	6 7 24	17 41 47	5 48 43	18 0 28	5 33 46	18 15 25	4 35 13	19 13 58
44.	7 27 8	16 22 3	6 39 5	17 10 6	6 11 19	17 37 52	5 52 1	17 57 10	5 36 35	18 12 36	4 36 12	19 12 59
46.	7 34 28	16 14 43	6 44 16	17 4 55	6 15 28	17 33 46	5 55 25	17 53 46	5 39 27	18 9 44	4 37 1	19 12 10
48.	7 42 28	16 6 43	6 49 47	16 59 24	6 19 45	17 29 26	5 58 57	17 50 14	5 42 23	18 6 48	4 37 39	19 11 32
50.	7 51 16	15 57 55	6 55 44	16 53 27	6 24 19	17 24 52	6 2 39	17 46 32	5 45 24	18 3 47	4 38 5	19 11 6
52.	8 1 3	15 48 8	7 2 9	16 47 2	6 29 11	17 20 0	6 6 31	17 42 40	5 48 31	18 0 40	4 38 18	19 10 53
54.	8 12 2	15 37 9	7 9 10	16 40 1	6 34 24	17 14 47	6 10 36	17 38 35	5 51 44	17 57 27	4 38 16	19 10 55
56.	8 24 33	15 24 38	7 16 53	16 32 18	6 40 3	17 9 8	6 14 58	17 34 13	5 55 7	17 54 4	4 37 57	19 11 14
58.	8 39 5	15 10 6	7 25 28	16 23 43	6 46 13	17 2 58	6 19 39	17 29 32	5 58 41	17 50 30	4 37 17	19 11 54
60.	8 56 20	14 52 51	7 35 8	16 14 3	6 53 1	16 56 10	6 24 43	17 24 28	6 2 28	17 46 43	4 36 14	19 12 57
62.	9 17 33	14 31 38	7 46 11	16 3 0	7 0 36	16 48 35	6 30 16	17 18 55	6 6 32	17 42 39	4 34 41	19 14 30
64.	9 45 10	14 4 1	7 59 1	15 50 10	7 9 10	16 40 1	6 36 27	17 12 44	6 10 57	17 38 14	4 32 34	19 16 37
66.	10 25 52	13 23 19	8 14 15	15 34 56	7 19 2	16 30 9	6 43 23	17 5 48	6 15 48	17 33 23	4 29 42	19 19 29
68.	0 0 0	24 0 0	8 32 54	15 16 17	7 30 35	16 18 36	6 51 20	16 57 51	6 21 14	17 27 57	4 25 54	19 23 17
70.	0 0 0	24 0 0	8 56 40	14 52 31	7 44 26	16 4 45	7 0 37	16 48 34	6 27 25	17 21 46	4 20 52	19 28 19
72.	0 0 0	24 0 0	9 29 13	14 19 58	8 1 35	15 47 36	7 11 44	16 37 27	6 34 38	17 14 33	4 14 10	19 35 1
74.	0 0 0	24 0 0	10 21 41	13 27 30	8 23 44	15 25 27	7 25 27	16 23 44	6 43 15	17 5 56	4 5 6	19 44 5
76.	0 0 0	24 0 0	0 0 0	24 0 0	9 42 19	14 6 52	8 7 11	15 42 0	6 53 58	16 55 13	3 52 31	19 56 40
78.	0 0 0	24 0 0	0 0 0	24 0 0	9 54 15	14 54 52	8 43 14	15 5 57	7 27 6	16 41 19	3 34 18	20 14 53
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	9 49 18	15 59 53	7 56 25	16 22 5	3 5 51	20 43 20
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	8 49 51	14 59 20	2 13 52	21 35 19
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	64	1	1	CLINATION OF SUN AT NOON	-23.26	EQUATION OF TIME	-0.35	300.	400.	500.	600.	700.	800.	900.	1000.
LAT	SUNRISE	HEIGHT	SUNSET	SUNRISE	HEIGHT	SUNSET	SUNRISE	HEIGHT	SUNSET	SUNRISE	HEIGHT	SUNSET	SUNRISE	HEIGHT	SUNSET
-88.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-86.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-84.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-82.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-80.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-78.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-76.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-74.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-72.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-70.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-68.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-66.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-64.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-62.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-60.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-58.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-56.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-54.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-52.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-50.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-48.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-46.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-44.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-42.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-38.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-36.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-34.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-32.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-28.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-26.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-24.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-22.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-18.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-16.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-14.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-12.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-8.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-6.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-4.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.	100.	300.	400.	1000.
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 59 22	18 6 37	5 20 18	18 39 41	4 39 58	19 25 1
2.	6 2 46	18 3 13	5 29 43	18 36 16	4 43 33	19 22 26
4.	6 6 11	17 59 48	5 33 6	18 32 53	4 47 1	19 18 58
6.	6 9 36	17 56 23	5 36 27	18 29 22	4 50 22	19 15 37
8.	6 13 31	17 52 56	5 39 46	18 26 13	4 53 38	19 12 21
10.	6 16 31	17 49 28	5 43 4	18 22 55	4 56 48	19 9 11
12.	6 20 3	17 45 56	5 46 21	18 19 38	4 59 54	19 6 5
14.	6 23 17	17 42 22	5 49 39	18 16 20	5 2 56	19 3 3
16.	6 27 15	17 38 44	5 52 57	18 13 2	5 5 53	19 0 6
18.	6 30 57	17 35 14	5 55 16	18 9 43	5 8 47	18 57 12
20.	6 34 45	17 31 14	5 58 37	18 6 22	5 11 39	18 54 20
22.	6 38 39	17 27 20	6 2 3	18 2 59	5 14 27	18 51 32
24.	6 42 40	17 23 19	6 6 26	17 59 33	5 17 13	18 48 46
26.	6 46 45	17 19 10	6 9 55	17 56 4	5 20 40	18 45 1
28.	6 51 36	17 14 52	6 13 29	17 52 30	5 23 22	18 42 37
30.	6 55 36	17 10 23	6 17 8	17 48 51	5 26 3	18 39 56
32.	7 0 17	17 5 42	6 20 53	17 45 6	5 29 44	18 36 15
34.	7 4 11	17 0 48	6 24 45	17 41 14	5 32 50	18 33 19
36.	7 8 17	16 55 37	6 28 40	17 37 13	5 36 5	18 29 54
38.	7 12 50	16 50 3	6 32 37	17 33 3	5 40 17	18 26 38
40.	7 17 53	16 44 15	6 37 17	17 28 42	5 44 17	18 23 58
42.	7 22 53	16 38 6	6 41 51	17 24 8	5 48 58	18 21 42
44.	7 27 35	16 31 24	6 46 40	17 19 19	5 52 54	18 18 54
46.	7 32 2	16 24 8	6 51 47	17 14 12	5 56 57	18 16 1
48.	7 36 57	16 17 32	6 56 41	17 9 19	6 2 24	18 13 5
50.	7 41 51	16 10 14	7 0 26	17 2 53	6 5 52	18 10 22
52.	7 46 45	16 3 42	7 5 21	16 56 38	6 9 32	18 6 53
54.	7 51 35	15 56 24	7 10 17	16 49 1	6 13 29	18 3 35
56.	7 56 27	15 49 48	7 15 11	16 42 3	6 17 43	18 0 6
58.	8 0 11	15 42 40	7 20 58	16 35 3	6 22 12	17 56 27
60.	8 4 31	15 35 24	7 25 50	16 28 11	6 26 47	17 52 30
62.	8 8 35	15 28 24	7 30 48	16 21 3	6 31 45	17 48 13
64.	8 12 59	15 21 14	7 35 43	16 14 11	6 36 48	17 43 31
66.	8 17 16	15 14 4	7 40 40	16 7 41	6 41 41	17 38 17
68.	8 21 53	15 7 24	7 45 37	16 0 24	6 46 43	17 32 19
70.	8 26 33	15 0 24	7 50 33	15 50 12	6 51 47	17 25 23
72.	8 31 17	14 53 24	7 55 28	15 43 41	6 56 48	17 18 6
74.	8 36 1	14 46 14	8 0 24	15 36 33	7 0 51	17 15 23
76.	8 40 53	14 39 4	8 5 19	15 29 24	7 5 18	17 12 6
78.	8 45 35	14 32 24	8 10 14	15 22 12	7 10 33	17 9 35
80.	8 50 17	14 25 14	8 15 7	15 15 4	7 15 48	17 6 51
82.	8 55 0	14 18 4	8 20 0	15 8 24	7 20 59	17 3 34
84.	9 0 0	14 11 24	8 25 0	15 1 24	7 26 11	17 0 27
86.	9 5 0	14 4 24	8 30 0	14 54 24	7 31 48	16 55 17
88.	9 10 0	13 57 24	8 35 0	14 47 24	7 36 48	16 52 25
90.	9 15 0	13 50 24	8 40 0	14 40 24	7 41 48	16 48 9
92.	9 20 0	13 43 24	8 45 0	14 33 24	7 46 48	16 44 0
94.	9 25 0	13 36 24	8 50 0	14 26 24	7 51 48	16 40 0
96.	9 30 0	13 29 24	8 55 0	14 19 24	7 56 48	16 36 0
98.	9 35 0	13 22 24	9 0 0	14 12 24	8 0 48	16 32 0
100.	9 40 0	13 15 24	9 5 0	14 5 24	8 5 48	16 28 0

70

DATE	64	1	2	DECLINATION OF SUN AT NOON	-21.25	EQUATION OF TIME	-0.15	400.	30.	SUNRISE	SUNSET	400.	30.	SUNRISE	SUNSET	1000.	30.
LAT	SCREEN	SUNRISE	SUNSET	HEIGHT = C.	HEIGHT = C.	DECLINATION OF TIME	30.	SUNRISE	SUNSET	400.	30.	SUNRISE	SUNSET	400.	30.	SUNRISE	SUNSET
-88.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-86.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-84.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-82.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-80.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-78.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-76.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-74.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-72.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-70.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-68.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-66.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-64.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-62.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-60.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-58.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-56.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-54.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-52.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-50.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-48.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-46.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-44.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-42.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-40.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-38.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-36.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-34.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-32.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-30.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-28.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-26.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-24.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-22.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-20.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-18.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-16.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-14.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-12.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-10.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-8.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-6.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-4.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C
-2.	C	C	C	24	C	C	C	C	C	C	C	C	C	C	C	C	C

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 25	18 12 34	5 32 46	18 45 13	5 12 51	19 5 8	4 58 38	19 19 21	4 47 5	19 30 54	4 0 25	20 17 34
2.	6 8 32	18 6 27	5 35 54	18 42 5	5 16 1	19 1 58	5 1 51	19 16 8	4 50 25	19 27 39	4 3 59	20 14 3
4.	6 11 32	18 6 21	5 38 59	18 39 5	5 15 9	18 58 52	5 4 58	19 13 1	4 53 29	19 24 30	4 7 21	20 10 38
6.	6 14 46	18 3 13	5 42 1	18 33 58	5 22 9	18 52 51	5 8 0	19 9 59	4 56 32	19 21 27	4 10 33	20 7 25
8.	6 17 55	18 0 4	5 45 3	18 29 56	5 25 8	18 52 51	5 10 58	19 7 1	4 59 25	19 18 30	4 13 34	20 4 25
10.	6 21 17	17 56 54	5 48 3	18 26 57	5 28 57	18 49 56	5 13 51	19 4 18	5 5 2	19 15 38	4 16 25	20 1 34
12.	6 24 32	17 53 42	5 51 2	18 23 58	5 31 57	18 47 2	5 16 41	19 1 18	5 7 51	19 12 51	4 19 7	19 58 52
14.	6 27 53	17 50 26	5 54 1	18 20 58	5 34 42	18 41 11	5 19 27	18 58 32	5 10 30	19 7 29	4 21 39	19 56 20
16.	6 30 52	17 47 7	5 57 1	18 17 58	5 37 37	18 38 33	5 22 11	18 53 8	5 13 5	19 4 54	4 24 4	19 53 55
18.	6 34 14	17 43 45	6 0 1	18 14 57	5 40 14	18 35 45	5 25 26	18 50 29	5 15 37	19 2 22	4 26 20	19 51 39
20.	6 37 42	17 40 17	6 3 2	18 11 54	5 42 14	18 32 58	5 27 30	18 47 52	5 18 6	18 59 53	4 29 28	19 49 31
22.	6 41 15	17 36 44	6 6 3	18 8 48	5 45 1	18 30 11	5 30 43	18 45 16	5 20 33	18 57 26	4 30 29	19 47 30
24.	6 44 54	17 33 5	6 9 11	18 5 40	5 48 48	18 27 23	5 32 7	18 42 42	5 22 56	18 55 3	4 32 21	19 45 38
26.	6 48 41	17 29 18	6 12 19	18 2 28	5 50 36	18 24 34	5 35 17	18 40 8	5 25 18	18 52 41	4 34 6	19 43 53
28.	6 52 35	17 25 24	6 15 31	18 2 19	5 53 26	18 21 43	5 37 51	18 37 35	5 28 38	18 50 21	4 35 43	19 42 16
30.	6 56 40	17 21 19	6 18 43	17 55 11	5 56 16	18 18 50	5 40 54	18 35 1	5 30 57	18 48 2	4 37 12	19 40 47
32.	7 0 54	17 17 5	6 22 9	17 52 23	6 2 4	18 15 55	5 42 38	18 35 1	5 32 14	18 45 45	4 38 34	19 39 25
34.	7 5 21	17 12 38	6 25 36	17 48 48	6 5 5	18 12 56	5 45 32	18 32 27	5 34 30	18 43 29	4 39 47	19 37 7
36.	7 10 2	17 7 57	6 29 11	17 44 8	6 8 6	18 9 53	5 48 7	18 29 52	5 36 46	18 41 13	4 40 52	19 37 12
38.	7 14 55	17 3 0	6 32 53	17 41 14	6 11 13	18 6 46	5 50 43	18 27 16	5 39 1	18 36 58	4 41 47	19 36 12
40.	7 20 15	16 57 44	6 36 45	17 37 11	6 14 27	18 3 32	5 53 21	18 24 38	5 41 17	18 36 42	4 42 33	19 35 26
42.	7 25 51	16 52 8	6 40 48	17 32 56	6 17 48	18 0 11	5 56 2	18 21 57	5 43 32	18 34 27	4 43 10	19 34 49
44.	7 31 53	16 48 30	6 45 1	17 28 25	6 21 17	17 56 42	6 1 35	18 19 12	5 45 49	18 32 10	4 43 35	19 34 24
46.	7 38 23	16 43 36	6 49 34	17 23 38	6 24 56	17 53 3	6 4 28	18 13 31	5 48 7	18 29 52	4 43 48	19 34 11
48.	7 45 27	16 38 42	6 54 21	17 18 30	6 28 46	17 45 9	6 7 28	18 10 31	5 50 27	18 27 32	4 43 32	19 34 27
50.	8 1 45	16 33 48	7 0 1	17 13 58	6 32 50	17 40 48	6 10 34	18 7 25	5 52 49	18 25 10	4 43 0	19 34 59
52.	8 11 18	16 28 54	7 7 11	17 9 57	6 37 11	17 36 8	6 13 50	18 4 9	5 55 14	18 22 45	4 42 8	19 35 51
54.	8 22 55	16 24 0	7 17 38	17 6 57	6 41 51	17 30 8	6 17 16	18 0 43	5 57 44	18 20 15	4 40 54	19 37 5
56.	8 34 26	16 19 5	7 24 55	16 53 4	6 46 55	17 31 4	6 20 56	17 57 3	6 0 3	18 17 41	4 39 14	19 38 45
58.	8 48 51	16 15 25	7 32 19	16 48 54	6 52 28	17 25 31	6 24 51	17 53 8	6 3 0	18 14 59	4 37 2	19 40 57
60.	9 6 5	16 11 54	7 42 19	16 43 40	6 58 37	17 19 22	6 29 9	17 48 52	6 5 49	18 12 10	4 36 11	19 43 48
62.	9 17 27	16 8 32	7 52 57	16 38 2	7 0 30	17 12 29	6 33 47	17 44 12	6 8 49	18 9 10	4 34 33	19 47 26
64.	9 27 27	16 5 32	8 0 25	16 33 34	7 13 22	17 4 37	6 38 59	17 39 0	6 12 32	18 5 57	4 32 56	19 52 3
66.	9 35 29	16 2 31	8 5 25	16 28 49	7 22 28	16 55 31	6 44 51	17 33 8	6 19 25	18 2 27	4 20 0	19 57 59
68.	10 3 37	16 0 49	8 13 40	16 23 18	7 31 14	16 44 45	6 51 36	17 26 23	6 23 49	17 58 34	4 12 22	20 5 37
70.	10 10 0	15 59 0	8 20 0	16 18 0	7 40 2	16 39 12	6 59 34	17 18 25	6 28 56	17 54 10	4 2 20	20 15 39
72.	10 17 0	15 51 0	8 27 0	16 11 0	7 48 14	16 31 39	7 9 14	17 8 45	6 35 4	17 42 55	3 48 50	20 48 2
74.	10 24 0	15 43 0	8 34 0	16 4 0	7 56 26	16 23 51	7 21 22	16 56 37	6 42 45	17 35 14	3 1 36	21 16 23
76.	10 31 0	15 35 0	8 41 0	15 57 0	8 0 38	16 15 32	7 28 30	16 48 7	6 52 57	17 25 2	2 0 0	22 0 0
78.	10 38 0	15 27 0	8 48 0	15 49 0	8 7 45	16 7 0	7 35 37	16 40 39	7 0 0	17 10 21	0 0 0	23 0 0
80.	10 45 0	15 19 0	8 55 0	15 41 0	8 14 52	16 0 0	7 42 44	16 32 21	7 7 38	17 0 21	0 0 0	24 0 0
82.	10 52 0	15 11 0	9 0 0	15 33 0	8 22 0	15 53 0	7 49 51	16 24 6	7 15 15	16 46 21	0 0 0	24 0 0
84.	11 0 0	15 3 0	9 7 0	15 25 0	8 29 0	15 45 0	7 57 0	16 16 0	7 22 0	16 38 0	0 0 0	24 0 0
86.	11 7 0	15 0 0	9 14 0	15 17 0	8 36 0	15 37 0	8 0 0	16 8 0	7 29 0	16 30 0	0 0 0	24 0 0
88.	11 14 0	14 52 0	9 21 0	15 9 0	8 43 0	15 29 0	8 7 0	16 0 0	7 36 0	16 22 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	64	2	1	DECLINATION OF SUN AT MCGN -17.29		EQUATION OF TIME -0.22		400.		1000.	
					SCREEN	HEIGHT = C.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	-88.	C	C	C	24	C	C	C	C	C	C	C
-86.	-86.	C	C	C	24	C	C	C	C	C	C	C
-84.	-84.	C	C	C	24	C	C	C	C	C	C	C
-82.	-82.	C	C	C	24	C	C	C	C	C	C	C
-80.	-80.	C	C	C	24	C	C	C	C	C	C	C
-78.	-78.	C	C	C	24	C	C	C	C	C	C	C
-76.	-76.	C	C	C	24	C	C	C	C	C	C	C
-74.	-74.	C	C	C	24	C	C	C	C	C	C	C
-72.	-72.	C	C	C	24	C	C	C	C	C	C	C
-70.	-70.	C	C	C	24	C	C	C	C	C	C	C
-68.	-68.	C	C	C	24	C	C	C	C	C	C	C
-66.	-66.	C	C	C	24	C	C	C	C	C	C	C
-64.	-64.	C	C	C	24	C	C	C	C	C	C	C
-62.	-62.	C	C	C	24	C	C	C	C	C	C	C
-60.	-60.	C	C	C	24	C	C	C	C	C	C	C
-58.	-58.	C	C	C	24	C	C	C	C	C	C	C
-56.	-56.	C	C	C	24	C	C	C	C	C	C	C
-54.	-54.	C	C	C	24	C	C	C	C	C	C	C
-52.	-52.	C	C	C	24	C	C	C	C	C	C	C
-50.	-50.	C	C	C	24	C	C	C	C	C	C	C
-48.	-48.	C	C	C	24	C	C	C	C	C	C	C
-46.	-46.	C	C	C	24	C	C	C	C	C	C	C
-44.	-44.	C	C	C	24	C	C	C	C	C	C	C
-42.	-42.	C	C	C	24	C	C	C	C	C	C	C
-40.	-40.	C	C	C	24	C	C	C	C	C	C	C
-38.	-38.	C	C	C	24	C	C	C	C	C	C	C
-36.	-36.	C	C	C	24	C	C	C	C	C	C	C
-34.	-34.	C	C	C	24	C	C	C	C	C	C	C
-32.	-32.	C	C	C	24	C	C	C	C	C	C	C
-30.	-30.	C	C	C	24	C	C	C	C	C	C	C
-28.	-28.	C	C	C	24	C	C	C	C	C	C	C
-26.	-26.	C	C	C	24	C	C	C	C	C	C	C
-24.	-24.	C	C	C	24	C	C	C	C	C	C	C
-22.	-22.	C	C	C	24	C	C	C	C	C	C	C
-20.	-20.	C	C	C	24	C	C	C	C	C	C	C
-18.	-18.	C	C	C	24	C	C	C	C	C	C	C
-16.	-16.	C	C	C	24	C	C	C	C	C	C	C
-14.	-14.	C	C	C	24	C	C	C	C	C	C	C
-12.	-12.	C	C	C	24	C	C	C	C	C	C	C
-10.	-10.	C	C	C	24	C	C	C	C	C	C	C
-8.	-8.	C	C	C	24	C	C	C	C	C	C	C
-6.	-6.	C	C	C	24	C	C	C	C	C	C	C
-4.	-4.	C	C	C	24	C	C	C	C	C	C	C
-2.	-2.	C	C	C	24	C	C	C	C	C	C	C

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN HEIGHT = C.	HEIGHT = C.	1000. 30.	400. 30.	1000. 30.	
-0.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
2.	6 9 42	18 16 41	5 18 25	19 7 58	5 4 34	19 21 49
4.	6 12 11	18 14 12	5 20 57	19 5 26	5 7 8	19 19 15
6.	6 14 41	18 11 42	5 23 24	19 2 59	5 9 36	19 16 47
8.	6 17 11	18 9 12	5 25 46	19 0 35	5 11 59	19 14 24
10.	6 19 42	18 6 41	5 28 9	18 58 14	5 14 18	19 12 5
12.	6 22 14	18 4 9	5 30 26	18 55 57	5 16 33	19 9 50
14.	6 24 47	18 1 36	5 32 41	18 53 42	5 18 44	19 7 39
16.	6 27 23	17 55 0	5 34 53	18 51 30	5 20 51	19 5 32
18.	6 30 2	17 52 40	5 37 4	18 49 19	5 22 55	19 3 28
20.	6 32 43	17 50 54	5 39 12	18 47 11	5 24 56	19 1 27
22.	6 35 29	17 48 5	5 41 15	18 45 4	5 26 54	18 59 29
24.	6 38 18	17 45 11	5 43 25	18 42 58	5 28 50	18 57 33
26.	6 41 12	17 42 11	5 45 38	18 40 53	5 30 43	18 55 40
28.	6 44 18	17 39 5	5 47 34	18 38 49	5 32 34	18 53 49
30.	6 47 31	17 37 52	5 49 38	18 36 45	5 34 22	18 52 1
32.	6 50 31	17 35 52	5 51 42	18 34 41	5 36 9	18 50 14
34.	6 53 52	17 33 31	5 53 46	18 32 37	5 37 55	18 48 28
36.	6 57 22	17 31 27	5 55 51	18 30 32	5 39 39	18 46 44
38.	7 0 1	17 29 20	5 57 57	18 28 26	5 41 21	18 45 2
40.	7 3 25	17 27 17	6 0 5	18 26 18	5 43 3	18 43 20
42.	7 6 18	17 25 8	6 2 14	18 24 9	5 44 44	18 41 39
44.	7 9 23	17 23 16	6 4 25	18 21 58	5 46 24	18 39 59
46.	7 12 7	17 21 50	6 6 38	18 19 43	5 48 3	18 38 20
48.	7 15 33	17 20 33	6 8 58	18 17 25	5 49 42	18 36 41
50.	7 18 57	17 19 16	6 11 21	18 15 2	5 51 21	18 35 2
52.	7 22 34	17 18 5	6 13 45	18 12 34	5 53 1	18 33 22
54.	7 26 8	17 16 55	6 16 23	18 10 0	5 54 41	18 31 42
56.	7 29 15	17 15 15	6 19 5	18 7 16	5 56 21	18 30 2
58.	7 32 13	17 13 13	6 21 56	18 4 27	5 58 3	18 28 20
60.	7 35 29	17 11 54	6 24 55	18 1 24	5 59 47	18 26 36
62.	7 38 41	17 10 34	6 28 16	17 58 7	6 1 33	18 24 50
64.	7 41 59	17 9 15	6 31 45	17 56 39	6 3 22	18 23 1
66.	7 45 23	17 8 44	6 35 44	17 54 34	6 5 14	18 21 9
68.	7 48 49	17 7 29	6 40 6	17 52 17	6 7 13	18 19 10
70.	7 52 15	17 6 14	6 45 2	17 50 0	6 9 18	18 17 5
72.	7 55 41	17 5 51	6 50 44	17 48 21	6 11 32	18 15 51
74.	7 59 18	17 4 36	6 55 28	17 46 17	6 13 59	18 14 24
76.	8 0 24	17 3 21	7 0 37	17 44 1	6 16 43	18 12 24
78.	8 4 30	17 2 6	7 5 50	17 42 33	6 19 43	18 10 9
80.	8 8 56	17 1 11	7 10 16	17 40 33	6 23 40	18 8 43
82.	8 13 34	17 0 56	7 15 50	17 38 21	6 28 28	18 7 55
84.	8 18 18	16 59 53	7 21 41	17 36 16	6 35 4	18 6 45
86.	8 23 1	16 58 24	7 27 44	17 34 0	6 45 17	18 5 19
88.	8 28 1	16 56 54	7 33 44	17 32 0	6 55 3	18 43 19

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	64	2	15	HEIGHT = 0.	DECLINATION OF SUN AT ACEN -12.91	EQUATION OF TIME -0.24	1000.	30.	SUNRISE	SUNSET	1000.	30.	SUNRISE	SUNSET
LAT	SCREEN	SUNRISE	SUNSET	HEIGHT = 0.	DECLINATION OF SUN AT ACEN -12.91	EQUATION OF TIME -0.24	1000.	30.	SUNRISE	SUNSET	1000.	30.	SUNRISE	SUNSET
-88.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-86.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-84.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-82.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-80.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-78.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-76.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-74.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-72.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-70.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-68.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-66.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-64.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-62.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-60.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-58.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-56.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-54.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-52.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-50.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-48.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-46.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-44.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-42.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-38.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-36.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-34.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-32.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-28.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-26.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-24.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-22.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-18.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-16.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-14.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-12.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-8.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-6.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-4.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-2.	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.	100. 30.	200. 30.	300. 30.	400. 30.	500. 30.	
-C.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
1.	6 10 58	18 17 49	5 29 46	18 49 1	5 20 46	19 8 1	5 13 13	19 32 34
2.	6 12 42	18 15 59	3 41 36	18 47 11	5 22 37	19 6 10	4 56 13	19 30 43
4.	6 14 38	18 14 9	3 43 24	18 45 23	5 24 24	19 4 23	4 58 54	19 28 53
6.	6 16 29	18 12 18	3 45 9	18 43 38	5 26 7	19 2 40	5 10 52	19 27 11
8.	6 18 19	18 10 28	3 46 53	18 41 54	5 27 47	19 1 0	5 12 35	19 25 34
10.	6 20 11	18 8 36	3 48 34	18 40 13	5 29 24	18 59 23	5 14 13	19 23 34
12.	6 22 4	18 6 43	3 50 15	18 38 32	5 30 58	18 57 37	5 15 46	19 21 33
14.	6 23 58	18 4 49	3 51 54	18 36 53	5 32 29	18 56 16	5 17 16	19 19 31
16.	6 25 54	18 2 53	3 53 33	18 35 14	5 33 58	18 54 49	5 18 42	19 17 15
18.	6 27 52	18 0 55	3 55 10	18 33 37	5 35 24	18 53 23	5 20 3	19 15 59
20.	6 29 53	17 58 54	3 56 47	18 32 0	5 36 47	18 52 0	5 21 22	19 14 40
22.	6 31 57	17 56 50	3 58 24	18 30 23	5 38 5	18 50 38	5 22 36	19 13 39
24.	6 34 4	17 54 43	4 0 1	18 28 46	5 39 28	18 49 19	5 23 47	19 12 37
26.	6 36 14	17 52 33	4 1 38	18 27 9	5 40 46	18 48 1	5 24 54	19 11 35
28.	6 38 30	17 50 17	4 3 15	18 25 32	5 42 2	18 46 45	5 25 59	19 10 33
30.	6 40 50	17 47 57	4 4 53	18 23 54	5 43 16	18 45 31	5 26 59	19 9 44
32.	6 43 16	17 45 31	4 6 32	18 22 15	5 44 26	18 44 19	5 27 56	19 8 44
34.	6 45 48	17 42 59	4 8 13	18 20 34	5 45 35	18 43 8	5 28 50	19 7 25
36.	6 48 27	17 40 20	4 9 55	18 18 52	5 46 48	18 41 54	5 29 40	19 6 11
38.	6 51 15	17 37 32	4 11 40	18 17 7	5 47 56	18 40 51	5 30 26	19 5 0
40.	6 54 12	17 34 25	4 13 27	18 15 20	5 49 3	18 39 44	5 31 47	19 4 58
42.	6 57 20	17 31 27	4 15 16	18 13 31	5 50 8	18 38 39	5 32 21	19 4 50
44.	7 0 41	17 28 6	4 17 10	18 11 37	5 51 12	18 37 35	5 32 50	19 4 49
46.	7 4 10	17 24 21	4 19 8	18 9 39	5 52 15	18 36 32	5 33 14	19 4 46
48.	7 8 7	17 20 40	4 21 11	18 7 36	5 53 17	18 35 20	5 33 33	19 4 41
50.	7 12 17	17 16 30	4 23 20	18 5 27	5 54 18	18 34 29	5 33 46	19 4 39
52.	7 16 51	17 11 56	4 25 36	18 3 11	5 55 17	18 33 30	5 33 51	19 4 38
54.	7 21 51	17 7 56	4 28 1	18 0 46	5 56 16	18 32 31	5 34 49	19 4 36
56.	7 27 23	17 1 24	4 30 36	17 58 11	5 57 13	18 31 34	5 35 38	19 4 34
58.	7 33 34	16 55 13	4 33 23	17 55 24	5 58 10	18 30 37	5 36 16	19 4 32
60.	7 40 33	16 48 14	4 36 25	17 52 22	5 59 5	18 29 42	5 36 42	19 4 30
62.	7 48 32	16 40 15	4 39 46	17 49 1	6 0 55	18 28 48	5 37 17	19 4 28
64.	7 57 46	16 31 1	4 43 29	17 45 18	6 0 52	18 27 55	5 37 46	19 4 26
66.	8 8 38	16 20 9	4 47 41	17 41 6	6 1 43	18 26 14	5 38 10	19 4 24
68.	8 21 44	16 7 3	4 52 30	17 36 17	6 2 30	18 25 27	5 38 39	19 4 22
70.	8 37 55	15 50 52	4 58 8	17 30 39	6 3 20	18 24 41	5 39 17	19 4 20
72.	8 58 43	15 30 4	5 4 51	17 23 56	6 4 6	18 23 59	5 39 43	19 4 18
74.	9 27 5	14 42 13	5 13 5	17 15 42	6 5 48	18 23 22	5 40 32	19 4 16
76.	10 10 34	14 18 13	5 23 25	16 51 22	6 5 56	18 22 51	5 41 30	19 4 14
78.	C C C	24 0 0	5 27 3	16 31 44	6 6 17	18 22 30	5 42 29	19 4 12
80.	C C C	24 0 0	5 27 42	16 3 12	6 6 20	18 22 27	5 43 19	19 4 10
82.	C C C	24 0 0	5 25 35	15 3 12	6 6 54	18 22 59	5 44 10	19 4 8
84.	C C C	24 0 0	5 25 35	15 3 12	6 6 54	18 22 59	5 45 10	19 4 8
86.	C C C	24 0 0	5 25 35	15 3 12	6 6 54	18 22 59	5 46 10	19 4 8
88.	C C C	24 0 0	5 25 35	15 3 12	6 6 54	18 22 59	5 47 10	19 4 8

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	64	3	1	HEIGHT = C.	DECLINATION OF SUN AT NOON	-7.47	EQUATION OF TIME -0.21	300.	400.	1000.
LAT	SCREEN	SUNRISE	SUNSET	100.	SUNRISE	SUNSET	200.	300.	SUNRISE	SUNSET
-88.	0	0	0	0	0	0	0	0	0	0
-86.	0	0	0	0	0	0	0	0	0	0
-84.	0	0	0	0	0	0	0	0	0	0
-82.	0	0	0	0	0	0	0	0	0	0
-80.	0	0	0	0	0	0	0	0	0	0
-78.	2	2	2	2	2	2	2	2	2	2
-76.	3	3	3	3	3	3	3	3	3	3
-74.	4	4	4	4	4	4	4	4	4	4
-72.	4	4	4	4	4	4	4	4	4	4
-70.	4	4	4	4	4	4	4	4	4	4
-68.	4	4	4	4	4	4	4	4	4	4
-66.	4	4	4	4	4	4	4	4	4	4
-64.	4	4	4	4	4	4	4	4	4	4
-62.	4	4	4	4	4	4	4	4	4	4
-60.	4	4	4	4	4	4	4	4	4	4
-58.	4	4	4	4	4	4	4	4	4	4
-56.	4	4	4	4	4	4	4	4	4	4
-54.	4	4	4	4	4	4	4	4	4	4
-52.	4	4	4	4	4	4	4	4	4	4
-50.	4	4	4	4	4	4	4	4	4	4
-48.	4	4	4	4	4	4	4	4	4	4
-46.	4	4	4	4	4	4	4	4	4	4
-44.	4	4	4	4	4	4	4	4	4	4
-42.	4	4	4	4	4	4	4	4	4	4
-40.	4	4	4	4	4	4	4	4	4	4
-38.	4	4	4	4	4	4	4	4	4	4
-36.	4	4	4	4	4	4	4	4	4	4
-34.	4	4	4	4	4	4	4	4	4	4
-32.	4	4	4	4	4	4	4	4	4	4
-30.	4	4	4	4	4	4	4	4	4	4
-28.	4	4	4	4	4	4	4	4	4	4
-26.	4	4	4	4	4	4	4	4	4	4
-24.	4	4	4	4	4	4	4	4	4	4
-22.	4	4	4	4	4	4	4	4	4	4
-20.	4	4	4	4	4	4	4	4	4	4
-18.	4	4	4	4	4	4	4	4	4	4
-16.	4	4	4	4	4	4	4	4	4	4
-14.	4	4	4	4	4	4	4	4	4	4
-12.	4	4	4	4	4	4	4	4	4	4
-10.	4	4	4	4	4	4	4	4	4	4
-8.	4	4	4	4	4	4	4	4	4	4
-6.	4	4	4	4	4	4	4	4	4	4
-4.	4	4	4	4	4	4	4	4	4	4

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.	1000.		400.		300.		200.		100.	
			SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	9	14	18 15 37	18 46 32	5 36 33	5 19 53	5 6 35	5 18 36	4 55 48	4 12 33	4 12 33	20 12 38
2.	6	10	17 14 54	18 45 35	5 39 36	5 20 56	5 7 38	19 17 33	4 56 51	4 13 41	4 13 41	20 11 30
4.	6	11	19 13 52	18 44 35	5 40 36	5 21 55	5 8 36	19 16 33	4 57 49	4 14 39	4 14 39	20 10 32
6.	6	12	22 12 45	18 43 37	5 41 34	5 22 50	5 9 36	19 15 41	4 58 42	4 15 28	4 15 28	20 9 43
8.	6	13	25 11 46	18 42 42	5 42 29	5 23 41	5 10 35	19 14 52	4 59 28	4 16 17	4 16 17	20 9 44
10.	6	14	29 10 42	18 41 48	5 43 23	5 24 29	5 11 43	19 14 8	5 0 10	4 16 37	4 16 37	20 8 34
12.	6	15	33 18 5 38	18 40 57	5 44 14	5 25 14	5 12 38	19 13 28	5 0 45	4 16 57	4 16 57	20 8 14
14.	6	16	37 18 8 34	18 40 7	5 45 4	5 25 55	5 12 48	19 12 53	5 1 16	4 17 8	4 17 8	20 8 3
16.	6	17	43 18 7 28	18 39 19	5 46 33	5 26 33	5 12 49	19 12 22	5 1 41	4 17 9	4 17 9	20 8 2
18.	6	18	49 18 6 22	18 38 32	5 46 39	5 27 8	5 13 15	19 11 56	5 2 0	4 17 9	4 17 9	20 8 11
20.	6	19	57 18 5 14	18 37 47	5 47 24	5 27 35	5 13 36	19 11 35	5 2 15	4 16 40	4 16 40	20 8 31
22.	6	21	7 18 4 4	18 37 7	5 48 7	5 28 7	5 13 53	19 11 18	5 2 21	4 16 10	4 16 10	20 8 9
24.	6	22	18 18 2 53	18 36 22	5 48 49	5 28 31	5 14 5	19 11 6	5 2 23	4 15 28	4 15 28	20 9 41
26.	6	23	31 18 1 40	18 35 42	5 49 29	5 28 52	5 14 11	19 11 0	5 2 18	4 14 34	4 14 34	20 10 37
28.	6	24	46 18 0 25	18 35 3	5 50 8	5 29 5	5 14 13	19 10 58	5 2 6	4 13 28	4 13 28	20 11 43
30.	6	26	4 17 59	18 34 26	5 50 45	5 29 22	5 14 8	19 11 3	5 1 48	4 12 7	4 12 7	20 13 4
32.	6	27	25 17 46	18 33 50	5 51 21	5 29 31	5 13 58	19 11 13	5 1 21	4 10 31	4 10 31	20 14 40
34.	6	28	49 17 34	18 33 15	5 51 56	5 29 36	5 13 41	19 11 30	5 0 47	4 8 39	4 8 39	20 16 32
36.	6	30	17 17 54	18 32 42	5 52 29	5 29 36	5 13 18	19 11 53	5 0 4	4 6 28	4 6 28	20 18 43
38.	6	31	50 17 32	18 32 10	5 53 1	5 29 31	5 12 47	19 12 24	4 59 11	4 3 58	4 3 58	20 21 13
40.	6	33	27 17 51 44	18 31 40	5 53 31	5 29 21	5 12 8	19 13 3	4 58 7	4 1 5	4 1 5	20 24 6
42.	6	35	10 17 50	18 31 11	5 54 0	5 29 5	5 11 19	19 13 52	4 56 52	3 57 46	3 57 46	20 27 25
44.	6	36	59 17 48 12	18 30 44	5 54 27	5 28 43	5 10 21	19 14 50	4 55 23	3 53 58	3 53 58	20 31 13
46.	6	38	56 17 46 15	18 30 16	5 54 53	5 28 14	5 9 11	19 16 0	4 53 40	3 49 37	3 49 37	20 35 34
48.	6	41	1 17 44 10	18 29 55	5 55 16	5 27 36	5 7 49	19 17 22	4 51 39	3 44 36	3 44 36	20 40 35
50.	6	43	16 17 41 55	18 29 33	5 55 38	5 26 50	5 6 12	19 18 59	4 49 20	3 38 48	3 38 48	20 46 23
52.	6	45	43 17 39 28	18 29 13	5 55 58	5 25 53	5 4 19	19 20 52	4 46 38	3 32 4	3 32 4	20 53 7
54.	6	48	23 17 36 48	18 28 56	5 56 15	5 24 44	5 2 6	19 23 5	4 43 30	3 24 12	3 24 12	21 0 59
56.	6	51	19 17 33 52	18 28 42	5 56 29	5 23 21	4 59 30	19 25 41	4 39 51	3 14 53	3 14 53	21 10 18
58.	6	54	34 17 30 37	18 28 30	5 56 41	5 21 41	4 56 26	19 28 45	4 35 35	3 3 43	3 3 43	21 21 28
60.	6	58	13 17 26 58	18 28 19	5 56 49	5 19 41	4 52 51	19 32 20	4 30 34	2 50 3	2 50 3	21 35 8
62.	7	2 20	17 22 51	18 28 19	5 56 52	5 17 18	4 48 34	19 36 37	4 24 37	2 32 47	2 32 47	22 15 22
64.	7	7 3	17 18 8	18 28 21	5 56 50	5 14 25	4 43 28	19 41 43	4 17 30	1 35 37	1 35 37	22 49 34
66.	7	12 30	17 12 41	18 28 22	5 56 42	5 12 54	4 37 19	19 47 52	4 13 30	0 0 0	0 0 0	24 0 0
68.	7	18 55	17 6 16	18 28 45	5 56 26	5 10 54	4 29 47	19 55 24	3 58 13	0 0 0	0 0 0	24 0 0
70.	7	26 36	16 58 35	18 29 11	5 56 0	5 1 16	4 22 24	20 4 47	3 44 45	0 0 0	0 0 0	24 0 0
72.	7	36 1	16 45 10	18 29 51	5 55 20	4 54 31	4 16 45	20 16 45	3 27 12	0 0 0	0 0 0	24 0 0
74.	7	47 55	16 37 16	18 30 50	5 54 21	4 45 48	4 9 39	20 32 30	3 3 6	0 0 0	0 0 0	24 0 0
76.	8	3 29	16 21 42	18 32 15	5 52 56	4 34 11	3 30 58	20 54 13	2 26 48	0 0 0	0 0 0	24 0 0
78.	8	25 22	16 0 9	18 34 21	5 50 50	4 18 0	2 58 29	21 26 42	1 13 37	0 0 0	0 0 0	24 0 0
80.	8	57 20	15 27 41	18 37 30	5 47 41	3 53 52	2 31 19	22 25 8	0 0 0	0 0 0	0 0 0	24 0 0
82.	9	55 56	14 5 15	18 42 30	5 43 41	3 13 21	20 31 19	24 0 0	0 0 0	0 0 0	0 0 0	24 0 0
84.	9	53 39	19 9 32	18 51 16	5 33 55	1 36 58	22 48 13	24 0 0	0 0 0	0 0 0	0 0 0	24 0 0
86.	9	50 0	24 0 0	19 9 32	5 13 39	0 0 0	24 0 0	24 0 0	0 0 0	0 0 0	0 0 0	24 0 0
88.	9	46 41	20 6 30	19 9 32	4 16 41	0 0 0	24 0 0	24 0 0	0 0 0	0 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	SCREEN HEIGHT = C.		DECLINATION OF SUN AT NOON		EQUATION OF TIME -2.01		300. 30.		400. 30.		1000. 30.	
		SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	0 0 0	24 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-86.	3 7 59	21 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-84.	4 16 5	20 1 54	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-82.	4 46	19 31 58	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-80.	5 3 17	19 14 42	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-78.	5 14 37	19 3 22	2 6 40	22 11 19	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-76.	5 22 38	19 35 21	2 55 30	21 22 29	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-74.	5 28 36	18 45 21	3 25 21	20 52 38	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-72.	5 33 18	18 44 41	3 46 21	20 51 38	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-70.	5 37 3	18 40 56	4 2 10	20 15 49	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-68.	5 40 6	18 37 53	4 14 35	20 3 24	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-66.	5 42 40	18 35 19	4 24 39	19 53 20	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-64.	5 44 51	18 33 8	4 32 59	19 45 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-62.	5 46 44	18 31 15	4 39 59	19 38 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-60.	5 48 22	18 28 37	4 45 59	19 32 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-58.	5 49 48	18 26 11	4 51 9	19 26 50	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-56.	5 51 5	18 24 54	4 55 40	19 22 19	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-54.	5 52 14	18 23 45	4 59 38	19 18 21	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-52.	5 53 16	18 22 43	5 3 9	19 14 50	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-50.	5 54 13	18 21 46	5 6 17	19 11 42	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-48.	5 55 4	18 20 55	5 9 6	19 8 53	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-46.	5 55 31	18 20 8	5 11 38	19 6 21	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-44.	5 56 35	18 21 24	5 13 56	19 4 3	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-42.	5 57 15	18 20 44	5 16 1	19 1 58	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-40.	5 57 53	18 20 6	5 17 54	19 0 5	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-38.	5 58 28	18 19 31	5 21 13	18 56 46	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-36.	5 59 33	18 18 58	5 24 0	18 55 19	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-34.	5 59 23	18 18 26	5 26 14	18 53 59	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-32.	6 0 30	18 17 57	5 28 14	18 52 45	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-30.	6 0 56	18 17 29	5 30 50	18 51 37	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-28.	6 1 21	18 16 58	5 32 22	18 50 34	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-26.	6 1 46	18 16 13	5 34 22	18 49 37	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-24.	6 2 9	18 15 50	5 36 16	18 48 43	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-22.	6 2 21	18 15 28	5 38 5	18 47 54	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-20.	6 2 52	18 14 46	5 41 16	18 47 9	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-18.	6 3 13	18 14 26	5 43 31	18 46 28	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-16.	6 3 33	18 14 7	5 45 50	18 45 50	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-14.	6 3 52	18 13 48	5 48 16	18 44 43	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-12.	6 4 11	18 13 29	5 50 33	18 43 48	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-10.	6 4 30	18 13 11	5 52 45	18 42 54	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-8.	6 4 48	18 12 54	5 54 55	18 42 24	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-6.	6 4 5	18 12 37	5 56 34	18 41 43	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-4.	6 4 5	18 12 22	5 58 11	18 41 1	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
-2.	6 5 2	18 12 7	5 59 34	18 40 33	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.	1000.		400.		300.		200.		100.	
			SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	6	5 19	18 12 20	18 42 45	5 16 43	19 1 16	5 3 31	19 14 28	4 52 49	19 25 10	4 10 0	20 7 59
2.	6	5 56	18 12 3	18 42 30	5 16 58	19 1 1	5 3 46	19 14 13	4 53 4	19 24 55	4 10 14	20 7 45
4.	6	6 13	18 11 46	18 42 16	5 17 9	19 0 50	5 3 56	19 14 3	4 53 13	19 24 46	4 10 19	20 7 40
6.	6	6 25	18 11 30	18 42 5	5 17 17	19 0 42	5 4 2	19 13 57	4 53 17	19 24 42	4 10 15	20 7 44
8.	6	6 45	18 11 14	18 41 57	5 17 21	19 0 38	5 4 2	19 13 57	4 53 14	19 24 45	4 10 1	20 7 58
10.	6	7 1	18 10 58	18 41 51	5 17 21	19 0 38	5 3 57	19 14 2	4 53 6	19 24 53	4 9 37	20 8 22
12.	6	7 18	18 10 41	18 41 47	5 17 17	19 0 42	5 3 48	19 14 11	4 52 52	19 25 7	4 9 2	20 8 57
14.	6	7 34	18 10 25	18 41 46	5 17 8	19 0 51	5 3 33	19 14 26	4 52 31	19 25 28	4 8 18	20 9 41
16.	6	7 50	18 10 9	18 41 48	5 16 56	19 1 3	5 3 13	19 14 46	4 52 4	19 25 55	4 7 22	20 10 37
18.	6	8 2	18 9 53	18 41 52	5 16 35	19 1 20	5 2 47	19 15 12	4 51 31	19 26 28	4 6 15	20 11 44
20.	6	8 22	18 9 37	18 41 59	5 16 18	19 1 44	5 2 15	19 15 44	4 50 50	19 27 9	4 4 56	20 13 3
22.	6	8 39	18 9 20	18 42 9	5 15 52	19 2 7	5 1 37	19 16 22	4 50 3	19 27 56	4 3 24	20 14 35
24.	6	8 55	18 9 4	18 42 21	5 15 21	19 2 38	5 0 53	19 17 6	4 49 7	19 28 52	4 3 24	20 14 35
26.	6	9 12	18 8 47	18 42 37	5 14 45	19 3 14	5 0 19	19 17 58	4 48 3	19 29 56	4 1 38	20 16 21
28.	6	9 30	18 8 29	18 42 56	5 14 3	19 3 56	4 59 2	19 18 57	4 46 50	19 31 9	3 57 21	20 20 38
30.	6	9 47	18 8 12	18 43 19	5 13 14	19 4 45	4 57 55	19 20 4	4 45 27	19 32 32	3 54 47	20 23 12
32.	6	10 5	18 7 54	18 43 46	5 12 20	19 5 39	4 56 40	19 21 19	4 43 54	19 34 5	3 51 53	20 26 6
34.	6	10 24	18 7 35	18 44 17	5 11 17	19 6 42	4 55 35	19 22 40	4 42 10	19 35 49	3 48 38	20 29 21
36.	6	10 43	18 7 16	18 44 52	5 10 8	19 7 51	4 53 19	19 24 20	4 40 12	19 37 47	3 44 59	20 33 0
38.	6	11 3	18 6 56	18 45 33	5 8 49	19 9 10	4 51 52	19 26 7	4 38 1	19 39 58	3 40 52	20 37 7
40.	6	11 23	18 6 36	18 46 19	5 7 20	19 10 39	4 49 52	19 28 7	4 35 34	19 42 25	3 36 14	20 41 45
42.	6	11 45	18 6 14	18 47 12	5 5 41	19 12 18	4 47 38	19 30 21	4 32 49	19 45 10	3 30 59	20 47 0
44.	6	12 7	18 5 52	18 48 11	5 3 50	19 14 9	4 45 7	19 32 52	4 29 44	19 48 15	3 25 2	20 52 57
46.	6	12 31	18 5 28	18 49 18	5 1 45	19 16 14	4 42 18	19 35 41	4 26 16	19 51 43	3 18 15	20 59 44
48.	6	12 56	18 5 3	18 50 34	4 59 24	19 18 35	4 39 7	19 38 52	4 22 22	19 55 37	3 10 28	21 7 31
50.	6	13 23	18 4 36	18 52 0	4 56 45	19 21 14	4 35 32	19 42 27	4 17 57	20 0 2	3 1 25	21 16 34
52.	6	13 52	18 4 7	18 53 37	4 53 45	19 24 14	4 31 28	19 46 31	4 12 56	20 5 3	2 50 46	21 27 13
54.	6	14 23	18 3 26	18 55 28	4 50 21	19 27 38	4 26 50	19 51 9	4 7 12	20 10 47	2 38 3	21 39 56
56.	6	14 57	18 3 2	18 57 36	4 46 28	19 31 31	4 21 31	19 56 28	4 0 35	20 17 24	2 22 24	21 55 35
58.	6	15 34	18 2 25	19 0 1	4 41 59	19 36 0	4 15 23	20 2 36	3 52 54	20 25 5	2 2 20	22 15 39
60.	6	16 15	18 1 44	19 2 50	4 36 48	19 41 11	4 8 15	20 9 44	3 43 52	20 34 7	1 34 16	22 43 43
62.	6	17 1	18 0 58	19 6 7	4 30 44	19 47 15	3 59 45	20 18 10	3 33 6	20 44 53	0 39 57	23 38 2
64.	6	17 53	18 0 6	19 9 58	4 23 35	19 54 24	3 49 45	20 28 14	3 20 1	20 57 58	0 0 0	24 0 0
66.	6	18 52	17 55 7	19 14 32	4 14 55	20 3 0	3 37 28	20 40 31	3 3 41	21 14 18	0 0 0	24 0 0
68.	6	20 0	17 57 59	19 20 1	4 4 31	20 13 28	3 22 8	20 55 51	2 42 27	21 35 32	0 0 0	24 0 0
70.	6	21 21	17 56 34	19 26 44	3 51 27	20 26 32	3 2 17	21 15 42	2 12 51	22 5 8	0 0 0	24 0 0
72.	6	22 58	17 55 1	19 35 7	3 34 37	20 43 22	2 34 58	21 43 1	1 23 24	22 54 35	0 0 0	24 0 0
74.	6	24 57	17 53 2	19 45 51	3 11 55	21 6 4	1 52 23	22 25 36	0 0 0	24 0 0	0 0 0	24 0 0
76.	6	27 29	17 50 30	19 58	2 38 45	21 39 14	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	6	30 49	17 47 10	20 19 58	1 39 48	22 38 11	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	6	35 28	17 42 31	20 50 1	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	6	42 23	17 35 36	21 43 23	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	6	53 54	17 14 5	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	6	71 12	17 1 47	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	6	92 58	15 43 1	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	64	4	1	DECLINATION OF SUN AT NOON		EQUATION OF TIME -C-0.7		400.		1000.	
					SUNRISE 100.	SUNSET 100.	SUNRISE 300.	SUNSET 300.	SUNRISE 400.	SUNSET 400.	SUNRISE 1000.	SUNSET 1000.
					HEIGHT = C.	HEIGHT = C.						
-88.					SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-86.					1 21 14	22 47 9	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-84.					1 27 16	20 41 7	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-82.					4 10 6	19 58 17	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-80.					4 33 33	19 34 50	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-78.					4 48 28	19 15 55	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-76.					5 16 48	19 5 35	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-74.					5 12 5	18 56 18	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-72.					5 16 23	18 51 50	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-70.					5 20 7	18 48 16	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-68.					5 23 0	18 45 23	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-66.					5 25 21	18 43 2	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-64.					5 27 19	18 41 4	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-62.					5 28 57	18 39 26	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-60.					5 30 18	18 38 5	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-58.					5 31 27	18 36 56	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-56.					5 32 25	18 35 58	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-54.					5 33 13	18 35 15	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-52.					5 34 27	18 34 30	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-50.					5 35 16	18 33 56	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-48.					5 36 54	18 33 29	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-46.					5 38 33	18 32 50	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-44.					5 40 17	18 32 7	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-42.					5 42 51	18 31 52	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-40.					5 45 35	18 31 23	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-38.					5 48 19	18 30 54	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-36.					5 51 3	18 30 25	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-34.					5 54 17	18 29 56	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-32.					5 57 1	18 29 27	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-30.					6 0 0	18 28 58	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-28.					6 3 35	18 28 29	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-26.					6 6 51	18 27 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-24.					6 10 17	18 27 30	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-22.					6 13 33	18 26 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-20.					6 16 49	18 26 29	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-18.					6 20 5	18 25 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-16.					6 24 21	18 25 29	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-14.					6 28 37	18 24 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-12.					6 32 53	18 24 29	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-10.					6 37 9	18 23 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-8.					6 41 25	18 23 29	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-6.					6 45 41	18 22 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-4.					6 50 57	18 22 29	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-2.					6 56 13	18 21 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN HEIGHT = C.	1000.	300.	400.	1000.
-C.	SUNRISE	SUNRISE	SUNRISE	SUNRISE	SUNRISE
1.	6 0 51	18 7 32	18 38 3	18 56 37	19 20 34
2.	6 0 12	18 8 11	18 38 44	18 57 19	19 21 19
3.	5 59 32	18 8 51	18 39 27	18 58 5	19 22 19
4.	5 58 52	18 9 31	18 40 13	18 58 56	19 23 6
5.	5 58 11	18 10 12	18 41 2	18 59 31	19 24 9
6.	5 57 30	18 10 53	18 41 55	19 0 50	19 25 18
7.	5 56 48	18 11 35	18 42 50	19 1 54	19 26 35
8.	5 56 5	18 12 18	18 43 49	19 3 3	19 27 58
9.	5 55 21	18 13 2	18 44 51	19 4 18	19 29 30
10.	5 54 36	18 13 47	18 45 53	19 5 38	19 31 10
11.	5 53 50	18 14 33	18 47 8	19 7 5	19 32 59
12.	5 53 3	18 15 21	18 48 24	19 8 38	19 34 57
13.	5 52 13	18 16 10	18 49 44	19 10 19	19 37 6
14.	5 51 21	18 17 2	18 51 10	19 12 7	19 39 26
15.	5 50 38	18 17 55	18 52 41	19 14 4	19 41 59
16.	5 49 52	18 18 51	18 54 25	19 16 10	19 44 45
17.	5 49 34	18 19 49	18 56 5	19 18 26	19 47 46
18.	5 48 53	18 20 50	19 0 58	19 20 54	19 51 4
19.	5 48 28	18 21 55	19 2 13	19 23 35	19 54 40
20.	5 47 53	18 23 3	19 3 46	19 26 30	19 58 38
21.	5 47 20	18 24 35	19 5 12	19 29 41	20 0 25
22.	5 46 48	18 25 32	19 7 12	19 33 10	20 2 59
23.	5 46 18	18 26 55	19 10 2	19 37 0	20 7 49
24.	5 45 59	18 28 24	19 13 8	19 41 13	20 13 10
25.	5 45 39	18 29 59	19 16 33	19 45 55	20 19 8
26.	5 45 24	18 31 43	19 20 19	19 51 9	20 25 50
27.	5 45 11	18 33 37	19 24 32	19 57 1	20 33 25
28.	5 44 51	18 35 41	19 29 14	20 3 39	20 42 5
29.	5 44 33	18 37 55	19 34 32	20 9 16	20 52 4
30.	5 44 17	18 40 33	19 40 33	20 15 57	21 3 47
31.	5 44 3	18 43 25	19 47 28	20 23 9	21 34 59
32.	5 43 42	18 46 41	19 55 30	20 32 15	21 57 5
33.	5 43 26	18 50 26	20 4 57	20 42 15	22 28 5
34.	5 43 13	18 54 47	20 16 16	20 56 56	23 27 42
35.	5 43 0	18 59 54	20 30 8	21 15 18	24 0 0
36.	5 42 50	19 5 54	20 47 39	21 39 25	24 0 0
37.	5 42 42	19 13 33	21 10 47	22 3 56	24 0 0
38.	5 42 35	19 22 48	21 43 48	22 14 8	24 0 0
39.	5 42 29	19 33 19	22 41 16	22 24 0	24 0 0
40.	5 42 24	19 44 5	23 0 0	22 34 0	24 0 0
41.	5 42 19	19 57 15	23 10 4	22 44 0	24 0 0
42.	5 42 15	20 10 33	23 21 16	22 55 58	24 0 0
43.	5 42 11	20 23 30	23 32 24	23 7 0	24 0 0
44.	5 42 8	20 37 39	23 43 32	23 18 0	24 0 0
45.	5 42 6	20 52 52	23 55 40	23 29 0	24 0 0
46.	5 42 4	21 9 10	24 7 0	23 40 0	24 0 0
47.	5 42 3	21 24 19	24 19 0	23 51 0	24 0 0
48.	5 42 2	21 39 32	24 31 0	24 2 0	24 0 0
49.	5 42 1	21 54 49	24 43 0	24 13 0	24 0 0
50.	5 42 0	22 10 10	24 55 0	24 24 0	24 0 0
51.	5 41 59	22 25 25	25 7 0	24 35 0	24 0 0
52.	5 41 58	22 40 40	25 19 0	24 46 0	24 0 0
53.	5 41 57	22 55 55	25 31 0	24 57 0	24 0 0
54.	5 41 56	23 11 10	25 43 0	25 8 0	24 0 0
55.	5 41 55	23 26 25	25 55 0	25 19 0	24 0 0
56.	5 41 54	23 41 40	26 7 0	25 30 0	24 0 0
57.	5 41 53	23 56 55	26 19 0	25 41 0	24 0 0
58.	5 41 52	24 12 10	26 31 0	25 52 0	24 0 0
59.	5 41 51	24 27 25	26 43 0	26 3 0	24 0 0
60.	5 41 50	24 42 40	26 55 0	26 14 0	24 0 0
61.	5 41 49	24 57 55	27 7 0	26 25 0	24 0 0
62.	5 41 48	25 13 10	27 19 0	26 36 0	24 0 0
63.	5 41 47	25 28 25	27 31 0	26 47 0	24 0 0
64.	5 41 46	25 43 40	27 43 0	26 58 0	24 0 0
65.	5 41 45	25 58 55	27 55 0	27 9 0	24 0 0
66.	5 41 44	26 14 10	28 7 0	27 20 0	24 0 0
67.	5 41 43	26 29 25	28 19 0	27 31 0	24 0 0
68.	5 41 42	26 44 40	28 31 0	27 42 0	24 0 0
69.	5 41 41	26 59 55	28 43 0	27 53 0	24 0 0
70.	5 41 40	27 15 10	28 55 0	28 4 0	24 0 0
71.	5 41 39	27 30 25	29 7 0	28 15 0	24 0 0
72.	5 41 38	27 45 40	29 19 0	28 26 0	24 0 0
73.	5 41 37	27 60 55	29 31 0	28 37 0	24 0 0
74.	5 41 36	27 76 10	29 43 0	28 48 0	24 0 0
75.	5 41 35	27 91 25	29 55 0	28 59 0	24 0 0
76.	5 41 34	27 106 40	30 7 0	29 10 0	24 0 0
77.	5 41 33	27 121 55	30 19 0	29 21 0	24 0 0
78.	5 41 32	27 137 10	30 31 0	29 32 0	24 0 0
79.	5 41 31	27 152 25	30 43 0	29 43 0	24 0 0
80.	5 41 30	27 167 40	30 55 0	29 54 0	24 0 0
81.	5 41 29	27 182 55	31 7 0	30 5 0	24 0 0
82.	5 41 28	27 198 10	31 19 0	30 16 0	24 0 0
83.	5 41 27	27 213 25	31 31 0	30 27 0	24 0 0
84.	5 41 26	27 228 40	31 43 0	30 38 0	24 0 0
85.	5 41 25	27 243 55	31 55 0	30 49 0	24 0 0
86.	5 41 24	27 259 10	32 7 0	30 60 0	24 0 0
87.	5 41 23	27 274 25	32 19 0	30 71 0	24 0 0
88.	5 41 22	27 289 40	32 31 0	30 82 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	DECLINATION OF SUN AT NOON		EQUATION OF TIME -0.		300.		400.		1000.		
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	
-88.	5	4	14	55	45	0	0	0	0	0	0
-86.	7	23	22	16	36	27	3	28	18	21	31
-84.	6	53	45	17	6	14	3	49	55	20	10
-82.	6	28	58	17	21	1	4	23	24	19	36
-80.	10	18	1	13	41	58	4	42	6	19	57
-78.	9	13	46	14	46	13	4	54	0	19	5
-76.	8	38	24	15	21	35	5	2	9	18	57
-74.	8	14	30	15	43	29	5	8	0	18	51
-72.	7	56	13	16	3	6	6	12	24	17	47
-70.	7	43	13	16	46	6	5	15	35	18	44
-68.	7	32	13	16	27	46	6	7	41	17	52
-66.	7	15	16	16	36	51	6	5	44	17	54
-64.	7	15	28	16	44	31	6	3	59	17	56
-62.	7	8	33	16	31	6	6	2	27	17	57
-60.	7	3	9	16	56	50	6	0	52	17	55
-58.	6	58	6	17	1	53	5	59	28	18	0
-56.	6	53	36	17	1	53	5	58	8	18	1
-54.	6	45	34	17	10	25	5	52	31	18	3
-52.	6	45	54	17	14	5	5	53	39	18	4
-50.	6	42	33	17	17	26	5	53	19	18	6
-48.	6	39	28	17	20	31	5	53	16	18	6
-46.	6	36	37	17	23	21	5	52	12	18	7
-44.	6	33	58	17	26	1	5	51	6	18	8
-42.	6	31	29	17	28	30	5	50	0	18	9
-40.	6	29	9	17	30	50	5	48	56	18	11
-38.	6	26	57	17	32	38	5	47	52	18	12
-36.	6	24	52	17	35	7	5	46	48	18	13
-34.	6	22	52	17	37	7	5	45	44	18	14
-32.	6	20	58	17	39	1	5	44	41	18	15
-30.	6	19	9	17	40	50	5	43	37	18	16
-28.	6	17	24	17	42	35	5	42	33	18	17
-26.	6	15	43	17	44	16	5	41	28	18	18
-24.	6	14	4	17	45	55	5	40	23	18	19
-22.	6	12	25	17	47	30	5	39	17	18	20
-20.	6	10	35	17	49	4	5	38	10	18	21
-18.	6	9	24	17	50	35	5	37	2	18	22
-16.	6	7	55	17	52	22	5	35	53	18	23
-14.	6	5	1	17	54	58	5	34	43	18	24
-12.	6	3	36	17	56	23	5	32	18	18	26
-10.	6	2	11	17	57	48	5	31	4	18	28
-8.	6	0	24	17	59	12	5	29	47	18	30
-6.	5	59	24	18	0	35	5	28	28	18	31
-4.	5	58	0	18	1	59	5	27	7	18	32

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-C.	5 56 37	18 3 22	5 23 44	18 34 15	5 6 56	18 53 3	4 53 33	19 6 26	4 42 41	19 17 18	3 59 6	20 0 53
2.	5 55 13	18 4 46	5 24 18	18 35 41	5 5 23	18 54 30	4 52 3	19 7 56	4 41 9	19 18 50	3 57 24	20 2 35
4.	5 53 49	18 6 10	5 22 50	18 37 9	5 3 56	18 56 3	4 50 48	19 9 31	4 39 31	19 20 28	3 55 32	20 4 27
6.	5 52 24	18 7 35	5 21 18	18 38 41	5 2 15	18 57 40	4 48 47	19 11 12	4 37 46	19 22 13	3 53 28	20 6 51
8.	5 50 58	18 9 1	5 19 43	18 40 16	5 0 38	18 59 21	4 46 55	19 13 0	4 35 55	19 24 4	3 51 13	20 8 46
10.	5 49 31	18 10 28	5 18 4	18 41 53	4 58 51	19 1 8	4 45 6	19 14 53	4 34 55	19 26 4	3 48 46	20 11 13
12.	5 48 3	18 11 56	5 16 21	18 43 38	4 56 58	19 3 1	4 43 5	19 16 54	4 31 48	19 28 11	3 46 5	20 13 54
14.	5 46 33	18 13 26	5 14 34	18 45 25	4 54 55	19 5 0	4 40 57	19 19 2	4 29 32	19 30 27	3 43 10	20 16 49
16.	5 45 1	18 14 56	5 12 43	18 47 16	4 52 54	19 7 5	4 38 42	19 21 17	4 27 7	19 32 52	3 39 59	20 20 0
18.	5 43 27	18 16 32	5 10 46	18 49 13	4 50 41	19 9 18	4 36 17	19 23 42	4 24 22	19 35 27	3 36 32	20 23 27
20.	5 41 51	18 18 8	5 8 43	18 51 16	4 48 21	19 11 38	4 33 43	19 26 16	4 21 46	19 38 13	3 32 47	20 27 12
22.	5 40 12	18 19 47	5 6 34	18 53 25	4 45 52	19 14 7	4 30 59	19 29 0	4 18 48	19 41 11	3 28 42	20 31 17
24.	5 38 29	18 21 30	5 4 19	18 55 40	4 43 14	19 16 45	4 28 3	19 31 56	4 15 37	19 44 22	3 24 13	20 35 46
26.	5 36 43	18 23 16	5 1 56	18 58 3	4 40 26	19 19 33	4 24 55	19 35 4	4 12 12	19 47 47	3 19 20	20 40 39
28.	5 34 53	18 25 6	4 59 25	19 0 34	4 37 27	19 22 32	4 21 34	19 38 25	4 8 31	19 51 28	3 13 58	20 46 1
30.	5 32 59	18 27 0	4 56 44	19 3 15	4 34 15	19 25 44	4 17 57	19 42 2	4 4 32	19 55 27	3 8 4	20 51 55
32.	5 30 59	18 29 0	4 53 54	19 6 5	4 30 49	19 29 10	4 14 4	19 45 55	4 0 14	19 59 45	3 1 31	20 58 28
34.	5 28 54	18 31 5	4 50 52	19 9 7	4 27 8	19 32 51	4 9 51	19 50 8	3 55 33	20 4 26	2 54 14	21 5 45
36.	5 26 42	18 33 17	4 47 37	19 12 22	4 23 9	19 36 50	4 5 17	19 54 42	3 50 27	20 9 32	2 46 5	21 13 54
38.	5 24 22	18 35 37	4 44 7	19 15 52	4 18 50	19 41 9	3 54 51	20 5 8	3 44 51	20 15 8	2 36 50	21 23 45
40.	5 21 55	18 38 4	4 40 21	19 19 38	4 14 8	19 45 51	3 48 51	20 11 8	3 31 53	20 28 6	2 13 53	21 46 6
42.	5 19 17	18 40 42	4 36 17	19 23 42	4 9 1	19 50 58	3 42 13	20 17 46	3 24 18	20 35 41	1 59 7	22 0 52
44.	5 16 29	18 43 30	4 31 51	19 28 8	4 3 23	19 56 36	3 34 50	20 25 9	3 15 46	20 44 13	1 40 44	22 19 15
46.	5 13 28	18 46 31	4 27 0	19 32 59	3 57 11	20 2 48	3 26 32	20 33 27	3 6 5	20 53 54	0 31 24	23 28 35
48.	5 10 13	18 49 46	4 21 40	19 38 19	3 50 16	20 9 43	3 17 8	20 42 51	2 54 58	21 5 1	0 0 0	24 0 0
50.	5 6 41	18 53 18	4 15 47	19 44 12	3 42 32	20 17 27	3 6 20	20 53 39	2 41 58	21 18 1	0 0 0	24 0 0
52.	5 2 49	18 57 10	4 9 12	19 50 47	3 33 47	20 26 12	2 55 46	21 6 13	2 26 24	21 33 35	0 0 0	24 0 0
54.	4 58 34	19 1 25	4 1 55	19 58 9	3 23 47	20 36 12	2 38 47	21 12 12	2 7 7	21 52 52	0 0 0	24 0 0
56.	4 53 51	19 6 8	3 53 27	20 6 32	3 12 12	20 47 47	1 56 34	22 3 25	1 41 34	22 16 21	0 0 0	24 0 0
58.	4 48 35	19 11 24	3 43 51	20 16 8	2 58 31	21 1 28	1 22 8	22 37 51	0 0 0	24 0 0	0 0 0	24 0 0
60.	4 42 38	19 17 21	3 32 40	20 27 19	2 41 58	21 18 1	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
62.	4 35 59	19 24 9	3 19 25	20 40 34	2 21 10	21 38 49	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
64.	4 27 59	19 32 0	3 3 19	20 56 40	1 53 14	22 6 45	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
66.	4 18 46	19 41 13	2 43 6	21 16 53	1 8 53	22 51 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	4 7 44	19 52 15	2 16 12	21 43 47	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	3 54 13	20 5 46	1 35 49	22 24 10	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	3 14 31	20 22 51	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	2 42 19	21 17 40	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	1 48 24	22 11 37	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	SCREEN	HEIGHT	DECLINATION OF SUN AT NCCN		EQUATION OF TIME G.C.5		400.		1000.	
				SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
				100.	30.	100.	30.	400.	30.	1000.	30.
-88.	C	C	24	C	C	C	C	C	C	C	C
-86.	C	C	24	C	C	C	C	C	C	C	C
-84.	C	C	24	C	C	C	C	C	C	C	C
-82.	C	C	24	C	C	C	C	C	C	C	C
-80.	C	C	24	C	C	C	C	C	C	C	C
-78.	C	C	24	C	C	C	C	C	C	C	C
-76.	C	C	24	C	C	C	C	C	C	C	C
-74.	C	C	24	C	C	C	C	C	C	C	C
-72.	C	C	24	C	C	C	C	C	C	C	C
-70.	C	C	24	C	C	C	C	C	C	C	C
-68.	C	C	24	C	C	C	C	C	C	C	C
-66.	C	C	24	C	C	C	C	C	C	C	C
-64.	C	C	24	C	C	C	C	C	C	C	C
-62.	C	C	24	C	C	C	C	C	C	C	C
-60.	C	C	24	C	C	C	C	C	C	C	C
-58.	C	C	24	C	C	C	C	C	C	C	C
-56.	C	C	24	C	C	C	C	C	C	C	C
-54.	C	C	24	C	C	C	C	C	C	C	C
-52.	C	C	24	C	C	C	C	C	C	C	C
-50.	C	C	24	C	C	C	C	C	C	C	C
-48.	C	C	24	C	C	C	C	C	C	C	C
-46.	C	C	24	C	C	C	C	C	C	C	C
-44.	C	C	24	C	C	C	C	C	C	C	C
-42.	C	C	24	C	C	C	C	C	C	C	C
-40.	C	C	24	C	C	C	C	C	C	C	C
-38.	C	C	24	C	C	C	C	C	C	C	C
-36.	C	C	24	C	C	C	C	C	C	C	C
-34.	C	C	24	C	C	C	C	C	C	C	C
-32.	C	C	24	C	C	C	C	C	C	C	C
-30.	C	C	24	C	C	C	C	C	C	C	C
-28.	C	C	24	C	C	C	C	C	C	C	C
-26.	C	C	24	C	C	C	C	C	C	C	C
-24.	C	C	24	C	C	C	C	C	C	C	C
-22.	C	C	24	C	C	C	C	C	C	C	C
-20.	C	C	24	C	C	C	C	C	C	C	C
-18.	C	C	24	C	C	C	C	C	C	C	C
-16.	C	C	24	C	C	C	C	C	C	C	C
-14.	C	C	24	C	C	C	C	C	C	C	C
-12.	C	C	24	C	C	C	C	C	C	C	C
-10.	C	C	24	C	C	C	C	C	C	C	C
-8.	C	C	24	C	C	C	C	C	C	C	C
-6.	C	C	24	C	C	C	C	C	C	C	C
-4.	C	C	24	C	C	C	C	C	C	C	C
-2.	C	C	24	C	C	C	C	C	C	C	C

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	SCREEN	HEIGHT = C.	100.		200.		300.		400.		1000.	
			SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 53 22	18 0 27	5 22 1	18 31 58	5 2 49	18 51 10	4 49 8	19 4 51	4 38 1	19 15 58	3 53 19	20 0 40
2.	5 51 22	18 2 37	5 19 48	18 34 11	5 0 33	18 53 26	4 46 49	19 7 10	4 35 39	19 18 20	3 50 42	20 3 17
4.	5 49 11	18 4 48	5 17 32	18 36 27	4 58 12	18 55 47	4 44 24	19 9 35	4 33 10	19 20 49	3 47 53	20 6 6
6.	5 46 59	18 7 0	5 15 12	18 38 47	4 55 45	18 58 13	4 41 53	19 12 6	4 30 34	19 23 25	3 44 52	20 9 7
8.	5 44 46	18 9 13	5 12 48	18 41 11	4 53 15	19 0 44	4 39 14	19 14 45	4 27 50	19 26 9	3 41 37	20 12 22
10.	5 42 31	18 11 28	5 10 20	18 43 39	4 50 37	19 3 22	4 36 29	19 17 30	4 24 58	19 29 1	3 38 7	20 15 52
12.	5 40 14	18 13 45	5 7 48	18 46 11	4 47 52	19 6 7	4 33 35	19 20 24	4 21 55	19 32 4	3 34 22	20 19 37
14.	5 37 55	18 16 4	5 5 9	18 48 50	4 45 1	19 8 58	4 30 32	19 23 27	4 18 43	19 35 16	3 30 20	20 23 39
16.	5 35 33	18 18 26	5 2 25	18 51 34	4 42 1	19 11 58	4 27 20	19 26 39	4 15 20	19 38 39	3 25 59	20 28 0
18.	5 33 8	18 20 51	4 59 35	18 54 24	4 38 52	19 15 7	4 23 57	19 30 2	4 11 44	19 42 15	3 21 17	20 32 42
20.	5 30 39	18 23 20	4 56 37	18 57 22	4 35 34	19 18 25	4 20 22	19 33 37	4 7 54	19 46 5	3 16 12	20 37 47
22.	5 28 5	18 25 54	4 53 30	19 0 29	4 32 4	19 21 55	4 16 35	19 41 26	3 50 30	19 50 9	3 10 40	20 43 19
24.	5 25 27	18 28 32	4 50 15	19 3 44	4 28 23	19 25 36	4 12 33	19 41 26	3 47 50	19 54 29	2 58 2	20 49 21
26.	5 22 43	18 31 16	4 46 50	19 7 9	4 24 29	19 29 30	4 8 15	19 45 44	3 44 50	19 59 9	2 50 46	21 3 13
28.	5 19 53	18 34 6	4 43 14	19 10 45	4 20 20	19 33 39	4 3 39	19 50 20	3 42 27	20 4 9	2 42 42	21 11 17
30.	5 16 56	18 37 3	4 39 25	19 14 34	4 15 54	19 38 5	3 58 43	19 55 16	3 38 36	20 15 23	2 33 40	21 20 19
32.	5 13 50	18 40 9	4 35 22	19 18 37	4 11 10	19 42 49	3 53 24	20 0 35	3 32 15	20 21 44	2 23 28	21 30 31
34.	5 10 36	18 43 23	4 31 4	19 22 55	4 6 4	19 47 55	3 47 39	20 6 20	3 25 19	20 28 40	2 11 45	21 42 14
36.	5 7 11	18 46 48	4 26 27	19 27 32	4 0 34	19 53 25	3 41 25	20 12 34	3 17 40	20 36 19	1 58 0	21 55 59
38.	5 3 35	18 50 24	4 21 30	19 32 29	3 54 36	19 59 23	3 34 35	20 19 24	2 59 42	20 44 48	1 41 18	22 12 41
40.	4 59 45	18 54 14	4 16 9	19 37 50	3 48 7	20 5 52	3 27 5	20 26 54	2 48 57	21 5 2	0 47 14	23 6 45
42.	4 55 40	18 58 19	4 10 22	19 43 37	3 40 59	20 13 0	3 18 47	20 35 12	2 36 37	21 17 22	0 0 0	24 0 0
44.	4 51 17	19 2 42	4 4 3	19 48 56	3 33 7	20 20 32	3 9 30	20 44 29	2 22 10	21 31 49	0 0 0	24 0 0
46.	4 46 34	19 7 25	3 57 6	19 56 53	3 24 21	20 29 38	2 47 1	21 6 58	2 4 43	21 49 16	0 0 0	24 0 0
48.	4 41 28	19 12 31	3 49 26	20 4 33	3 14 30	20 39 29	2 33 1	21 20 58	1 42 34	22 11 25	0 0 0	24 0 0
50.	4 35 53	19 18 6	3 40 53	20 13 6	3 3 17	20 50 42	2 16 16	21 37 43	1 11 17	22 42 42	0 0 0	24 0 0
52.	4 29 46	19 24 13	3 31 15	20 22 44	2 50 20	21 3 39	1 55 20	21 58 39	0 0 0	24 0 0	0 0 0	24 0 0
54.	4 22 59	19 31 0	3 20 16	20 33 43	2 35 1	21 18 58	1 27 3	22 26 56	0 0 0	24 0 0	0 0 0	24 0 0
56.	4 15 24	19 38 35	3 7 34	20 46 25	2 16 22	21 37 37	0 37 22	23 16 37	0 0 0	24 0 0	0 0 0	24 0 0
58.	4 6 51	19 47 8	2 52 33	21 1 26	1 52 27	22 1 32	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
60.	3 57 4	19 56 55	2 34 17	21 15 42	1 18 11	22 35 48	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
62.	3 45 43	20 6 16	2 11 5	21 42 54	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
64.	3 32 18	20 21 41	1 36 59	22 15 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
66.	3 16 2	20 37 57	0 39 47	23 14 12	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	2 55 39	20 58 20	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	2 28 39	21 25 20	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	1 48 54	22 5 5	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

[illegible]

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		1CC.		2CC.		3CC.		4CC.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 52 52	17 55 55	5 20 42	18 32 53	5 1 6	18 51 41	4 47 6	19 5 41	4 35 44	19 17 3	3 49 55	20 2 52
2.	5 50 7	18 2 40	5 17 54	18 34 53	4 58 14	18 54 33	4 44 10	19 8 37	4 32 45	19 20 2	3 46 35	20 6 12
4.	5 47 21	18 5 26	5 15 2	18 37 45	4 55 16	18 57 31	4 41 8	19 11 39	4 29 38	19 23 9	3 43 3	20 9 44
6.	5 44 35	18 8 12	5 12 7	18 40 40	4 52 14	19 0 33	4 37 59	19 14 48	4 26 23	19 26 24	3 39 16	20 13 31
8.	5 41 46	18 11 1	5 9 7	18 43 40	4 49 4	19 3 43	4 34 43	19 18 4	4 23 0	19 29 47	3 35 15	20 17 32
10.	5 38 56	18 13 51	5 6 2	18 46 45	4 45 48	19 6 59	4 31 17	19 21 30	4 19 26	19 33 21	3 30 57	20 21 50
12.	5 36 3	18 16 44	5 2 51	18 49 56	4 42 25	19 10 22	4 27 43	19 25 4	4 15 42	19 37 5	3 26 21	20 26 26
14.	5 33 7	18 19 40	4 59 34	18 53 13	4 38 52	19 13 54	4 23 58	19 28 49	4 11 46	19 41 1	3 21 24	20 31 23
16.	5 30 7	18 22 40	4 56 10	18 56 37	4 35 11	19 17 36	4 20 2	19 32 45	4 7 37	19 45 10	3 16 5	20 36 42
18.	5 27 3	18 25 44	4 52 39	19 0 8	4 31 19	19 21 28	4 11 32	19 41 15	4 3 13	19 49 34	3 10 21	20 42 26
20.	5 23 55	18 28 52	4 48 58	19 3 49	4 27 16	19 25 31	4 6 54	19 45 53	3 53 37	19 59 10	3 4 8	20 48 39
22.	5 20 40	18 32 7	4 45 8	19 7 39	4 22 59	19 29 48	4 1 59	19 50 48	3 48 20	20 4 27	2 57 22	20 55 25
24.	5 17 20	18 35 27	4 41 7	19 11 40	4 18 29	19 34 18	3 56 45	19 56 2	3 42 40	20 10 7	2 41 48	21 10 59
26.	5 13 52	18 38 55	4 36 54	19 15 53	4 13 42	19 39 5	3 51 9	20 1 38	3 36 35	20 16 12	2 32 44	21 20 3
28.	5 10 17	18 42 30	4 32 27	19 20 20	4 8 38	19 44 9	3 45 8	20 7 39	3 30 0	20 22 47	2 22 32	21 30 15
30.	5 6 32	18 46 15	4 27 45	19 25 2	4 3 12	19 49 35	3 38 38	20 14 9	3 22 52	20 29 55	2 10 55	21 41 52
32.	5 2 36	18 50 11	4 22 45	19 30 2	3 57 24	19 55 23	3 31 35	20 21 12	3 15 3	20 37 44	1 57 23	21 55 24
34.	4 58 29	18 54 18	4 17 25	19 35 22	3 51 9	20 1 38	3 23 54	20 28 53	3 6 27	20 46 20	1 41 9	22 11 38
36.	4 54 8	18 58 39	4 11 43	19 41 4	3 44 23	20 8 24	3 15 27	20 37 20	2 56 54	20 55 53	1 20 30	22 32 17
38.	4 49 32	19 3 15	4 5 34	19 47 13	3 37 1	20 15 46	3 6 4	20 46 43	2 46 10	21 6 37	0 50 27	23 2 20
40.	4 44 38	19 8 9	3 58 56	19 53 51	3 28 57	20 23 50	2 55 34	20 57 13	2 33 57	21 18 50	0 0 0	24 0 0
42.	4 39 24	19 13 23	3 51 41	20 1 6	3 20 3	20 32 44	2 49 39	21 9 8	2 19 47	21 33 0	0 0 0	24 0 0
44.	4 33 46	19 19 1	3 43 45	20 9 2	3 10 7	20 42 40	2 43 36	21 22 54	2 14 42	22 11 5	0 0 0	24 0 0
46.	4 27 41	19 25 6	3 34 59	20 17 48	2 58 54	20 53 53	2 13 36	21 39 11	1 41 42	22 40 11	0 0 0	24 0 0
48.	4 21 4	19 31 43	3 25 12	20 27 35	2 46 5	21 6 42	1 53 33	21 59 14	1 12 36	23 46 47	0 0 0	24 0 0
50.	4 13 48	19 38 59	3 14 9	20 38 38	2 31 6	21 21 41	1 27 1	22 25 46	0 6 0	24 0 0	0 0 0	24 0 0
52.	4 5 46	19 47 1	3 1 31	20 51 16	2 13 6	21 39 41	0 43 36	23 9 11	0 0 0	24 0 0	0 0 0	24 0 0
54.	3 56 48	19 55 59	2 46 46	21 6 1	1 50 24	22 2 23	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
56.	3 46 41	20 6 6	2 29 7	21 23 40	1 18 49	22 33 58	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
58.	3 35 7	20 17 40	2 7 4	21 45 43	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
60.	3 21 38	20 31 9	1 37 21	22 15 26	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
62.	3 5 37	20 47 10	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
64.	2 45 57	21 6 50	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
66.	2 20 36	21 32 11	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
68.	1 44 44	22 8 3	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
70.	0 32 24	23 20 23	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
72.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

[illegible]

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = C.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 54	0 18	5 21	9 18	5 1	7 18	4 46	48	4 35	10 19	3 48	10 20
2.	5 50	45 18	5 17	50 18	4 57	43 18	4 43	21 19	4 31	38 19	3 44	12 20
4.	5 47	29 18	5 14	27 18	4 54	14 19	4 39	46 19	4 27	58 19	3 40	12 20
6.	5 44	11 18	5 11	0 18	4 50	35 19	4 36	3 19	4 24	9 19	3 35	33 20
8.	5 40	52 18	5 7	28 18	4 46	57 19	4 32	12 19	4 20	9 19	3 30	49 20
10.	5 37	30 18	5 3	51 18	4 43	7 19	12 19	4 28	4 15	59 19	3 25	46 20
12.	5 34	6 18	5 0	7 18	4 39	8 19	16 19	4 24	4 11	37 19	3 20	22 20
14.	5 30	37 18	4 56	16 18	4 35	0 19	20 19	4 19	4 7	2 19	3 14	34 20
16.	5 27	5 18	4 52	17 19	4 30	41 19	24 19	4 15	4 2	11 19	3 8	20 20
18.	5 23	27 18	4 48	9 19	4 26	10 19	29 19	4 10	3 57	4 19	3 1	35 20
20.	5 19	43 18	4 43	50 19	4 21	26 19	33 19	4 5 8	3 51	39 20	2 54	15 21
22.	5 15	53 18	4 39	21 19	4 16	27 19	38 19	4 5 8	3 45	52 20	2 46	13 21
24.	5 11	55 18	4 34	38 19	4 11	11 19	44 19	3 54	3 39	42 20	2 37	23 21
26.	5 7	49 18	4 29	41 19	4 5 36	19	49 19	3 47	3 33	5 20	2 27	32 21
28.	5 3	32 18	4 24	28 19	3 59	40 19	55 19	3 41	3 25	56 20	2 16	26 21
30.	4 59	5 18	4 18	57 19	3 53	15 20	1 52	3 34	3 18	11 20	2 3	41 21
32.	4 54	24 19	4 13	4 19	3 46	29 20	8 42	3 26	3 9	43 20	1 48	40 22
34.	4 49	29 19	4 6	47 19	3 39	7 20	16 4	3 18	2 50	3 21	1 30	12 22
36.	4 44	18 19	4 0	2 19	3 31	6 20	24 5	3 9	2 38	23 21	0 16	59 23
38.	4 38	47 19	3 52	45 20	3 22	30 20	32 51	2 58	2 25	2 21	0 0	24 0 0
40.	4 32	54 19	3 44	50 20	3 12	39 20	42 32	2 47	2 9	23 22	0 0	24 0 0
42.	4 26	35 19	3 36	10 20	3 1	51 20	53 20	2 34	1 50	23 22	0 0	24 0 0
44.	4 19	47 19	3 26	36 20	2 49	38 21	5 33	2 19	1 25	40 22	0 0	24 0 0
46.	4 12	24 19	3 15	55 20	2 35	36 21	19 35	2 1	0 46	58 23	0 0	24 0 0
48.	4 4	19 19	3 50	20 21	2 19	3 21	36 8	1 38	0 0	0 24	0 0	24 0 0
50.	3 55	23 19	2 49	58 21	1 58	48 21	56 23	1 5	0 0	0 24	0 0	24 0 0
52.	3 45	26 20	2 33	41 21	1 32	15 22	22 56	0 0	0 0	0 24	0 0	24 0 0
54.	3 34	13 20	2 13	55 21	0 50	7 23	5 4	0 0	0 0	0 24	0 0	24 0 0
56.	3 21	23 20	1 48	32 22	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
58.	3 6	24 20	1 11	25 22	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
60.	2 48	29 21	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
62.	2 26	11 21	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
64.	1 56	33 21	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
66.	1 9	59 22	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
68.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
70.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
72.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
74.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
76.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
78.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
80.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
82.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
84.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
86.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0
88.	0 0	0 24	0 0	0 24	0 0	0 24	0 0	0 0	0 0	0 24	0 0	24 0 0

TABLE I.-- SUNRISE AND SUNSET TIMES - Continued

DATE	64	6 15	DECLINATION OF SUN AT NOON		EQUATION OF TIME		400.		300.		100.	
			HEIGHT = 0.		200.		30.		30.		30.	
			SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	0	0	0	0	0	0	0	0	0	0	0	0
-86.	0	0	0	0	0	0	0	0	0	0	0	0
-84.	0	0	0	0	0	0	0	0	0	0	0	0
-82.	0	0	0	0	0	0	0	0	0	0	0	0
-80.	0	0	0	0	0	0	0	0	0	0	0	0
-78.	0	0	0	0	0	0	0	0	0	0	0	0
-76.	0	0	0	0	0	0	0	0	0	0	0	0
-74.	0	0	0	0	0	0	0	0	0	0	0	0
-72.	0	0	0	0	0	0	0	0	0	0	0	0
-70.	0	0	0	0	0	0	0	0	0	0	0	0
-68.	0	0	0	0	0	0	0	0	0	0	0	0
-66.	10	33	32	13	26	27	8	20	38	15	39	21
-64.	9	52	1	14	7	58	8	5	16	15	54	43
-62.	9	24	4	14	35	55	7	52	20	16	7	39
-60.	9	2	40	14	57	19	7	41	13	16	18	46
-58.	8	45	17	15	14	42	7	31	29	16	28	30
-56.	8	30	39	15	29	20	7	22	51	16	37	8
-54.	8	18	4	15	41	55	7	15	5	16	44	54
-52.	8	7	1	15	52	58	7	8	1	16	51	58
-50.	7	57	11	16	2	48	7	1	34	16	58	25
-48.	7	48	20	16	11	39	6	55	35	17	4	24
-46.	7	40	17	16	19	42	6	50	2	17	9	57
-44.	7	32	55	16	27	4	6	44	50	17	15	9
-42.	7	26	7	16	33	52	6	39	55	17	20	4
-40.	7	19	48	16	40	11	6	35	16	17	24	43
-38.	7	13	53	16	46	6	6	30	51	17	29	8
-36.	7	8	20	16	51	39	6	26	36	17	33	23
-34.	7	3	5	16	56	54	6	22	32	17	37	27
-32.	6	58	6	17	1	53	6	18	36	17	41	23
-30.	6	53	21	17	6	38	6	14	47	17	45	12
-28.	6	48	48	17	11	11	6	11	5	17	48	54
-26.	6	44	26	17	15	33	6	7	28	17	52	31
-24.	6	40	14	17	19	45	6	3	55	17	56	4
-22.	6	36	10	17	23	49	6	0	26	17	59	33
-20.	6	32	13	17	27	46	5	57	0	18	2	59
-18.	6	28	22	17	31	37	5	53	36	18	6	23
-16.	6	24	36	17	35	23	5	50	14	18	9	45
-14.	6	20	55	17	39	4	5	46	54	18	13	5
-12.	6	17	18	17	42	41	5	43	33	18	16	26
-10.	6	13	45	17	46	14	5	40	13	18	19	46
-8.	6	10	13	17	49	46	5	36	52	18	23	7
-6.	6	6	44	17	53	15	5	33	30	18	26	29
-4.	6	3	16	17	56	43	5	30	7	18	29	52
-2.	5	59	49	18	0	10	5	26	41	18	33	18

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = 0.		100.		200.		300.		400.		500.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 56 22	18 3 37	5 23 13	18 36 46	5 3 7	18 56 59	4 48 33	19 11 26	4 36 48	19 23 11	3 49 15	20 17 44
2.	5 52 54	18 7 5	5 19 42	18 40 17	4 59 24	19 0 35	4 44 52	19 15 7	4 33 2	19 26 57	3 45 2	20 14 57
4.	5 49 26	18 10 33	5 16 6	18 43 53	4 55 42	19 4 17	4 41 4	19 18 55	4 29 8	19 30 51	3 42 34	20 12 25
6.	5 45 57	18 14 2	5 12 27	18 47 32	4 51 53	19 8 6	4 37 8	19 22 51	4 25 5	19 34 54	3 35 53	20 24 9
8.	5 42 25	18 17 34	5 8 42	18 51 17	4 47 57	19 12 2	4 33 3	19 26 56	4 20 51	19 39 8	3 33 48	20 29 11
10.	5 38 51	18 21 8	5 4 51	18 55 8	4 43 54	19 16 5	4 28 48	19 31 11	4 16 26	19 43 33	3 25 26	20 34 33
12.	5 35 13	18 24 46	5 0 54	18 59 5	4 39 41	19 20 18	4 24 22	19 35 37	4 11 49	19 48 10	3 19 42	20 43 17
14.	5 31 32	18 28 27	4 56 49	19 3 10	4 35 18	19 24 41	4 19 44	19 40 15	4 6 57	19 53 2	3 13 32	20 45 27
16.	5 27 46	18 32 13	4 52 35	19 7 24	4 31 44	19 29 15	4 14 53	19 45 6	4 1 49	19 58 13	3 6 54	20 53 5
18.	5 23 55	18 36 4	4 48 13	19 11 46	4 25 57	19 34 2	4 9 46	19 50 13	3 56 24	20 3 35	2 59 43	21 3 16
20.	5 19 57	18 40 7	4 43 39	19 16 20	4 20 56	19 39 3	4 4 22	19 55 37	3 50 39	20 9 21	2 51 53	21 8 6
22.	5 15 52	18 44 2	4 38 53	19 21 6	4 15 39	19 44 20	3 58 39	20 1 20	3 44 32	20 15 27	2 43 18	21 15 41
24.	5 11 39	18 48 20	4 33 54	19 26 5	4 10 4	19 49 55	3 52 35	20 7 24	3 37 59	20 22 1	2 33 47	21 25 12
26.	5 7 17	18 52 42	4 28 39	19 31 20	4 4 9	19 55 50	3 46 5	20 13 54	3 30 57	20 29 2	2 23 8	21 35 51
28.	5 2 44	18 57 15	4 23 7	19 36 52	3 57 51	20 2 8	3 39 7	20 20 52	3 23 21	20 36 38	2 11 2	21 49 57
30.	4 57 59	19 2 0	4 17 14	19 42 45	3 51 6	20 8 53	3 31 36	20 28 23	3 15 5	20 44 54	1 56 57	22 3 2
32.	4 53 0	19 6 59	4 10 59	19 49 0	3 43 51	20 16 8	3 23 27	20 36 32	3 6 2	20 53 57	1 42 3	22 13 59
34.	4 47 45	19 12 14	4 4 18	19 55 41	3 35 59	20 24 0	3 14 32	20 45 27	2 56 2	21 3 57	1 18 13	22 41 46
36.	4 42 13	19 17 46	3 57 7	20 2 52	3 27 26	20 32 33	3 4 42	20 55 17	2 44 51	21 15 8	0 44 54	23 15 5
38.	4 36 19	19 23 40	3 49 21	20 10 38	3 18 2	20 41 57	2 53 44	21 6 15	2 32 9	21 27 50	0 3 3	24 3 2
40.	4 30 1	19 29 58	3 42 52	20 19 7	3 7 37	20 52 22	2 41 20	21 18 39	2 17 28	21 42 31	0 3 3	24 3 2
42.	4 23 16	19 36 43	3 31 34	20 28 25	2 55 56	21 4 3	2 27 4	21 32 55	1 59 56	22 0 3	0 3 3	24 3 2
44.	4 15 58	19 44 1	3 21 15	20 38 44	2 42 37	21 17 22	2 13 13	21 49 46	1 37 55	22 22 4	0 3 3	24 3 2
46.	4 8 1	19 51 58	3 9 41	20 50 18	2 27 7	21 32 52	1 49 26	22 10 33	1 6 53	22 53 9	0 3 3	24 3 2
48.	3 59 18	20 0 41	2 56 31	21 3 28	2 8 32	21 51 27	1 21 33	22 38 26	0 3 3	24 3 2	0 3 3	24 3 2
50.	3 49 38	20 10 21	2 41 15	21 18 44	1 44 59	22 15 0	0 33 33	23 29 26	0 3 3	24 3 2	0 3 3	24 3 2
52.	3 38 50	20 21 9	2 23 1	21 36 58	1 11 27	22 48 32	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
54.	3 26 34	20 33 25	2 0 17	21 59 42	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
56.	3 12 26	20 47 33	1 29 16	22 30 43	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
58.	2 55 45	21 4 14	0 29 38	23 30 21	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
60.	2 35 27	21 24 32	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
62.	2 9 23	21 50 36	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
64.	1 32 5	22 27 54	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
66.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
68.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
70.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
72.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 3	24 3 2	0 3 3	24 3 2

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

DATE	LAT	DECLINATION OF SUN AT NOON		EQUATION OF TIME - 0.06		405.		1000.	
		7	1	100.	200.	300.	405.	1000.	300.
		SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-86.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-84.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-82.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-80.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-78.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-76.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-74.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-72.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-70.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-68.	0 0 0	24 0 0	0 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0
-66.	10 30 30	13 36 41	8 21 19	15 45 52	7 26 23	16 40 48	6 50 51	17 16 20	6 23 20
-64.	9 51 18	14 15 53	8 6 19	16 0 52	7 16 42	16 50 29	6 44 4	17 23 7	6 18 37
-62.	9 24 19	14 42 52	7 53 41	16 13 39	7 8 16	16 58 55	6 38 1	17 29 12	6 14 19
-60.	9 3 29	15 3 42	7 42 47	16 24 24	7 3 48	17 6 23	6 32 34	17 34 37	6 10 21
-58.	8 46 29	15 20 42	7 33 15	16 33 56	6 54 6	17 13 5	6 27 35	17 39 36	6 6 39
-56.	8 32 9	15 35 2	7 24 46	16 42 25	6 48 2	17 19 9	6 22 59	17 44 12	6 3 10
-54.	8 19 47	15 47 24	7 17 9	16 50 2	6 42 27	17 24 44	6 18 42	17 48 29	5 59 52
-52.	8 8 55	15 58 16	7 13 13	16 56 58	6 37 18	17 29 53	6 14 41	17 52 30	5 56 42
-50.	7 59 14	16 7 57	7 3 52	17 3 19	6 32 30	17 34 41	6 10 52	17 56 19	5 53 39
-48.	7 50 32	16 16 39	6 57 59	17 9 12	6 28 0	17 39 11	6 7 14	17 59 57	5 50 41
-46.	7 42 36	16 24 35	6 52 31	17 14 40	6 23 44	17 43 27	6 3 45	18 3 26	5 47 49
-44.	7 35 20	16 31 51	6 47 24	17 19 47	6 19 41	17 47 30	6 0 24	18 6 47	5 44 59
-42.	7 28 38	16 38 33	6 42 34	17 24 37	6 15 48	17 51 23	5 57 9	18 10 2	5 42 13
-40.	7 22 23	16 44 48	6 38 0	17 29 11	6 12 4	17 55 7	5 53 58	18 13 13	5 39 29
-38.	7 16 33	16 50 38	6 33 38	17 33 33	6 8 28	17 58 43	5 50 53	18 16 18	5 36 47
-36.	7 11 4	16 56 7	6 29 27	17 37 44	6 4 59	18 2 12	5 47 50	18 19 21	5 34 5
-34.	7 5 53	17 1 18	6 25 26	17 41 45	6 1 34	18 5 37	5 44 50	18 22 21	5 31 24
-32.	7 0 58	17 6 13	6 21 34	17 45 37	5 58 15	18 8 56	5 41 52	18 25 19	5 28 43
-30.	6 56 17	17 10 54	6 17 48	17 49 23	5 54 59	18 12 12	5 38 56	18 28 15	5 26 2
-28.	6 51 48	17 15 23	6 14 9	17 53 2	5 51 46	18 15 25	5 36 0	18 31 11	5 23 20
-26.	6 47 29	17 19 42	6 10 35	17 56 36	5 48 35	18 18 36	5 33 5	18 34 6	5 20 37
-24.	6 43 20	17 23 51	6 7 5	18 0 6	5 45 26	18 21 45	5 30 10	18 37 1	5 17 52
-22.	6 39 18	17 27 53	6 3 39	18 3 32	5 42 18	18 24 53	5 27 14	18 39 57	5 15 5
-20.	6 35 24	17 31 47	6 0 15	18 6 56	5 39 11	18 28 0	5 24 17	18 42 54	5 12 17
-18.	6 31 36	17 35 35	5 56 54	18 10 17	5 36 4	18 31 7	5 21 19	18 45 52	5 9 25
-16.	6 27 53	17 39 18	5 53 35	18 13 36	5 32 56	18 34 15	5 18 19	18 48 52	5 6 31
-14.	6 24 15	17 42 56	5 50 17	18 16 54	5 29 48	18 37 23	5 15 17	18 51 54	5 3 33
-12.	6 20 40	17 46 31	5 46 59	18 20 12	5 26 38	18 40 33	5 12 12	18 54 59	5 0 31
-10.	6 17 9	17 50 2	5 43 41	18 23 30	5 23 26	18 43 45	5 9 3	18 58 8	4 57 25
-8.	6 13 40	17 53 31	5 40 22	18 26 49	5 20 12	18 46 59	5 5 51	19 1 20	4 54 14
-6.	6 10 13	17 56 58	5 37 3	18 30 8	5 16 55	18 50 16	5 2 35	19 4 36	4 50 58
-4.	6 6 48	18 0 23	5 33 42	18 33 29	5 13 35	18 53 36	4 59 15	19 7 56	4 47 36
-2.	6 3 23	18 3 48	5 30 19	18 36 52	5 10 11	18 57 0	4 55 49	19 11 22	4 44 8

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

LAT	HEIGHT = 0.		100.		200.		300.		400.		500.		600.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	5 59 58	18 7 13	5 26 53	18 40 18	5 6 42	19 0 29	4 52 17	19 14 54	4 40 33	19 26 38	3 53 7	20 14 4	3 53 7	20 14 4
2.	5 56 33	18 10 38	5 23 24	18 43 47	5 3 8	19 4 3	4 48 38	19 18 33	4 36 50	19 30 21	3 48 57	20 18 14	3 48 57	20 18 14
4.	5 53 7	18 14 4	5 19 51	18 47 20	4 59 29	19 7 42	4 44 53	19 22 18	4 32 59	19 34 12	3 44 32	20 22 39	3 44 32	20 22 39
6.	5 49 40	18 17 31	5 16 14	18 50 57	4 55 43	19 11 28	4 40 59	19 26 12	4 28 58	19 38 13	3 39 51	20 27 23	3 39 51	20 27 23
8.	5 46 11	18 21 0	5 12 32	18 54 39	4 51 53	19 15 21	4 36 57	19 37 14	4 24 48	19 42 23	3 34 53	20 32 18	3 34 53	20 32 18
10.	5 42 39	18 24 32	5 8 44	18 58 27	4 47 49	19 19 22	4 32 45	19 34 26	4 20 26	19 46 45	3 29 35	20 37 36	3 29 35	20 37 36
12.	5 39 4	18 28 7	5 4 49	19 2 22	4 43 39	19 23 32	4 28 22	19 38 49	4 15 51	19 51 21	3 25 54	20 43 17	3 25 54	20 43 17
14.	5 35 26	18 31 45	5 0 47	19 6 24	4 39 19	19 27 52	4 23 47	19 43 24	4 11 2	19 56 9	3 17 49	20 49 22	3 17 49	20 49 22
16.	5 31 42	18 35 29	4 56 36	19 10 35	4 34 48	19 32 23	4 18 59	19 48 12	4 5 58	20 1 13	3 11 16	20 55 55	3 11 16	20 55 55
18.	5 27 54	18 39 17	4 52 16	19 14 55	4 30 4	19 37 7	4 13 56	19 53 15	4 0 37	20 6 34	3 4 13	21 3 1	3 4 13	21 3 1
20.	5 23 59	18 43 12	4 47 46	19 19 25	4 25 6	19 42 5	4 8 36	19 58 35	3 54 56	20 12 15	2 56 26	21 13 45	2 56 26	21 13 45
22.	5 19 57	18 47 14	4 43 3	19 24 8	4 19 53	19 47 18	4 2 57	20 4 14	3 48 53	20 18 18	2 47 58	21 19 13	2 47 58	21 19 13
24.	5 15 47	18 51 24	4 38 7	19 29 4	4 14 22	19 52 49	3 56 56	20 17 15	3 42 24	20 24 47	2 38 35	21 23 36	2 38 35	21 23 36
26.	5 11 28	18 55 43	4 32 56	19 34 15	4 8 31	19 58 40	3 50 31	20 16 40	3 35 27	20 31 44	2 28 6	21 39 5	2 28 6	21 39 5
28.	5 6 58	19 0 13	4 27 27	19 39 44	4 2 17	20 4 54	3 43 38	20 23 33	3 27 57	20 39 14	2 16 12	21 53 59	2 16 12	21 53 59
30.	5 2 16	19 4 55	4 21 39	19 45 32	3 55 37	20 11 34	3 35 13	20 30 58	3 19 47	20 47 24	2 2 24	22 4 47	2 2 24	22 4 47
32.	4 57 21	19 9 50	4 15 29	19 51 42	3 48 27	20 18 44	3 28 9	20 39 2	3 10 51	20 56 22	1 45 53	22 21 18	1 45 53	22 21 18
34.	4 52 10	19 15 1	4 8 52	19 58 19	3 42 41	20 26 30	3 19 21	20 47 50	3 0 59	21 6 12	1 24 51	22 42 23	1 24 51	22 42 23
36.	4 46 42	19 20 29	4 1 46	20 5 25	3 32 14	20 34 57	3 9 39	20 57 32	2 49 58	21 17 13	0 53 50	23 13 21	0 53 50	23 13 21
38.	4 40 53	19 26 18	3 54 6	20 13 5	3 22 58	20 44 13	2 58 51	21 8 20	2 37 29	21 29 42	0 3 24	24 3 3	0 3 24	24 3 3
40.	4 34 40	19 32 31	3 45 44	20 21 27	3 12 42	20 54 29	2 46 39	21 20 32	2 23 5	21 44 6	0 3 24	24 3 3	0 3 24	24 3 3
42.	4 28 0	19 39 11	3 36 33	20 30 38	3 1 12	21 5 59	2 32 39	21 34 32	2 5 57	22 1 14	0 3 24	24 3 3	0 3 24	24 3 3
44.	4 20 48	19 46 23	3 26 24	20 40 47	2 48 6	21 19 5	2 16 10	21 51 1	1 44 36	22 22 35	0 3 24	24 3 3	0 3 24	24 3 3
46.	4 12 57	19 54 14	3 15 0	20 52 11	2 32 55	21 34 16	1 55 58	22 11 13	1 15 6	22 52 5	0 3 24	24 3 3	0 3 24	24 3 3
48.	4 4 22	20 2 49	3 2 4	21 5 7	2 14 46	21 52 25	1 29 13	22 37 58	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
50.	3 54 51	20 12 20	2 47 5	21 20 6	1 51 58	22 15 13	0 44 11	23 23 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
52.	3 44 13	20 22 58	2 29 16	21 37 55	1 29 9	22 47 2	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
54.	3 32 11	20 35 0	2 7 11	22 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
56.	3 18 18	20 48 53	1 37 30	22 29 41	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
58.	3 1 59	21 5 12	0 45 42	23 21 29	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
60.	2 42 11	21 25 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
62.	2 16 57	21 50 14	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
64.	1 41 31	22 25 40	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
66.	0 23 12	23 43 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
68.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
70.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
72.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 24	24 3 3	0 3 24	24 3 3	0 3 24	24 3 3

TABLE I.- SUNRISE AND SUNSET TIMES - Continued

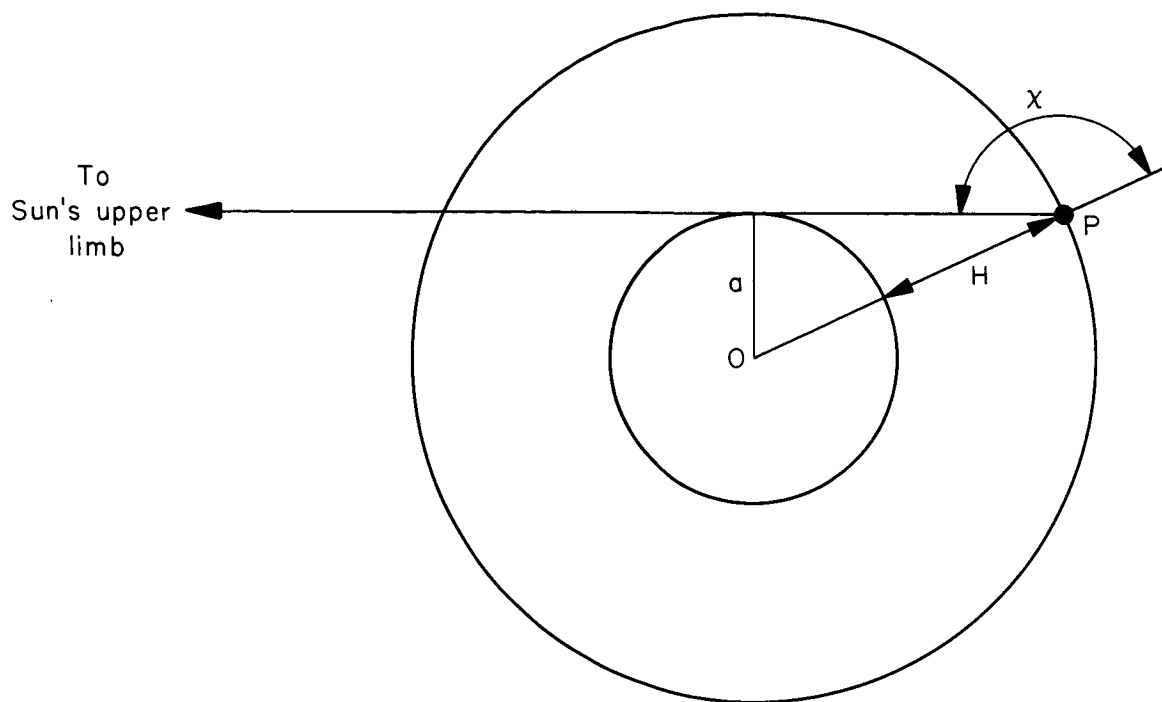
DATE	64	7 15	DECLINATION OF SUN AT NOON		21.48		EQUATION OF TIME -0.10		39.30.		40.30.		100.30.	
			SCREEN HEIGHT = 0.	HEIGHT = 0.	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-88.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-86.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-84.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-82.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-80.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-78.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-76.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-74.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-72.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-70.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-68.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-66.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-64.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-62.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-60.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-58.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-56.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-54.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-52.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-50.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-48.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-46.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-44.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-42.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-38.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-36.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-34.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-32.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-28.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-26.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-24.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-22.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-18.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-16.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-14.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-12.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-8.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-6.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-4.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-2.	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE I.- SUNRISE AND SUNSET TIMES - Concluded

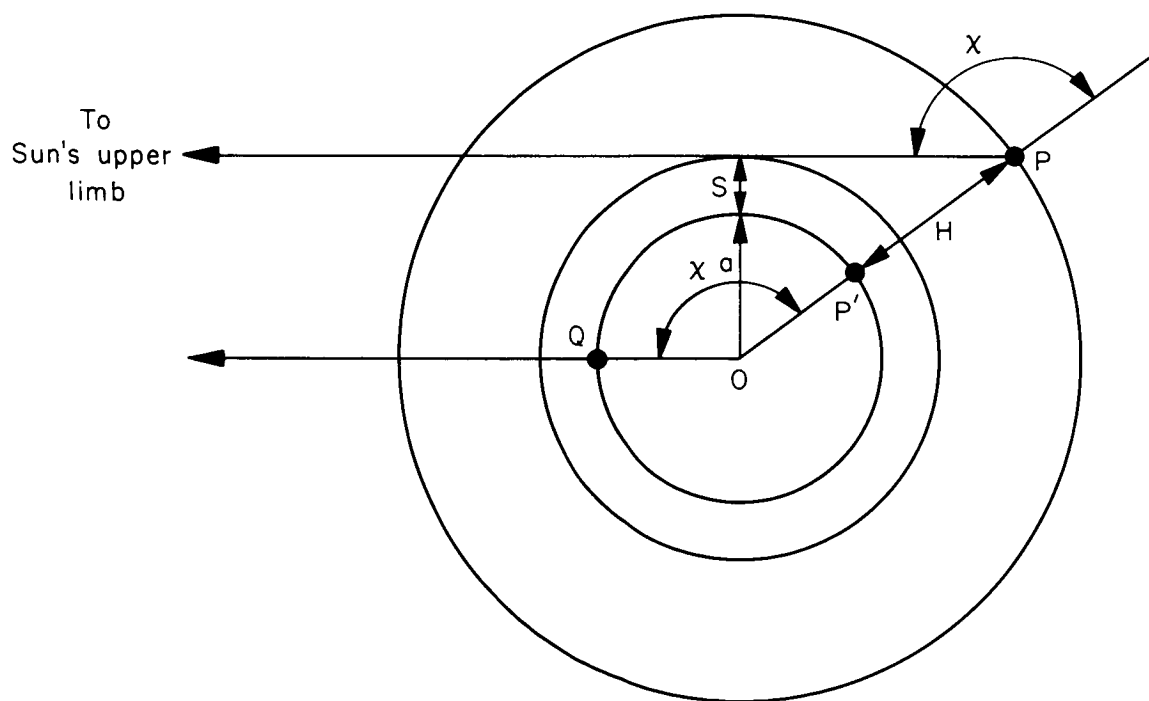
LAT	HEIGHT = 0.		100.		200.		300.		400.		1000.	
	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET	SUNRISE	SUNSET
-0.	6 2 25	18 9 34	5 29 43	18 42 16	5 9 46	19 2 13	4 55 31	19 16 28	4 43 57	19 28 2	3 57 11	20 14 48
2.	5 59 15	18 12 44	5 26 30	18 45 29	5 6 49	19 5 30	4 52 10	19 19 49	4 40 31	19 31 28	3 53 21	20 18 38
4.	5 56 6	18 15 53	5 23 13	18 48 46	5 3 6	19 8 39	4 48 42	19 23 17	4 36 58	19 35 1	3 49 18	20 22 41
6.	5 52 54	18 19 5	5 19 52	18 52 7	4 59 37	19 12 22	4 45 6	19 26 53	4 33 15	19 38 44	3 44 59	20 27 3
8.	5 49 41	18 22 18	5 16 27	18 55 32	4 56 1	19 15 58	4 41 22	19 30 37	4 29 23	19 42 36	3 45 23	20 31 36
10.	5 46 26	18 25 33	5 12 56	18 59 3	4 52 18	19 19 41	4 37 28	19 34 31	4 25 20	19 46 39	3 35 29	20 35 32
12.	5 43 7	18 28 52	5 9 19	19 2 40	4 48 27	19 23 32	4 33 25	19 38 34	4 21 6	19 50 53	3 31 15	20 41 44
14.	5 39 46	18 32 13	5 5 34	19 6 25	4 44 26	19 27 33	4 29 10	19 42 49	4 16 38	19 55 21	3 24 38	20 47 21
16.	5 36 19	18 35 40	5 1 42	19 10 17	4 40 14	19 31 45	4 24 42	19 47 17	4 11 56	20 0 3	3 18 35	20 52 24
18.	5 32 49	18 39 13	4 57 42	19 14 17	4 35 51	19 36 8	4 20 1	19 51 58	4 6 58	20 5 1	3 12 3	20 59 56
20.	5 29 12	18 42 47	4 53 31	19 18 28	4 31 15	19 40 44	4 15 4	19 56 55	4 1 42	20 10 17	3 4 57	21 7 2
22.	5 25 29	18 46 30	4 49 9	19 22 50	4 26 25	19 45 34	4 9 50	20 2 9	3 56 6	20 15 53	2 57 11	21 14 48
24.	5 21 39	18 50 20	4 44 35	19 27 24	4 21 18	19 50 41	4 4 16	20 7 43	3 50 7	20 21 52	2 48 39	21 23 23
26.	5 17 40	18 54 19	4 39 47	19 32 12	4 15 53	19 56 6	3 58 20	20 13 39	3 43 41	20 28 18	2 39 13	21 32 49
28.	5 13 32	18 58 27	4 34 44	19 37 15	4 10 7	20 1 52	3 51 58	20 20 1	3 36 46	20 35 13	2 28 31	21 43 28
30.	5 9 13	19 2 46	4 29 22	19 42 37	4 3 58	20 8 1	3 45 8	20 26 51	3 29 16	20 42 43	2 16 22	21 55 37
32.	5 4 41	19 7 18	4 23 40	19 48 19	3 57 21	20 14 38	3 37 43	20 34 16	3 21 5	20 50 54	2 2 13	22 9 49
34.	4 59 56	19 12 3	4 17 35	19 54 24	3 52 13	20 21 46	3 29 39	20 42 20	3 12 5	20 59 54	1 44 57	22 27 2
36.	4 54 55	19 17 4	4 11 3	20 0 56	3 42 28	20 29 31	3 25 48	20 51 11	3 2 6	21 9 53	1 22 39	22 49 23
38.	4 49 35	19 22 24	4 4 0	20 7 59	3 34 0	20 37 59	3 11 0	21 0 59	2 50 54	21 21 5	0 47 27	23 24 32
40.	4 43 54	19 28 5	3 56 21	20 15 38	3 24 40	20 47 19	3 0 2	21 11 57	2 38 9	21 33 50	0 3 2	24 3
42.	4 37 49	19 34 10	3 47 59	20 24 0	3 14 16	20 57 43	2 47 35	21 24 24	2 23 19	21 48 40	0 3 2	24 3
44.	4 31 15	19 40 44	3 38 45	20 33 14	3 2 33	21 9 26	2 33 12	21 38 47	2 5 30	22 6 29	0 3 2	24 3
46.	4 24 8	19 47 51	3 28 29	20 43 30	2 49 9	21 22 50	2 16 5	21 55 54	1 42 55	22 29 4	0 3 2	24 3
48.	4 16 21	19 55 38	3 16 55	20 55 4	2 33 29	21 38 30	1 54 50	22 17 9	1 10 29	23 1 30	0 3 2	24 3
50.	4 7 46	20 4 13	3 3 41	21 8 18	2 14 32	21 57 27	1 25 56	22 46 3	0 0 1	24 0 3	0 3 2	24 3
52.	3 58 14	20 13 45	2 48 14	21 23 45	1 50 29	22 21 39	0 28 23	23 43 36	0 0 0	24 0 0	0 3 2	24 3
54.	3 47 30	20 24 29	2 29 41	21 42 18	1 15 10	22 56 49	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
56.	3 35 15	20 36 44	2 6 20	22 5 39	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
58.	3 21 2	20 50 57	1 33 59	22 38 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
60.	3 4 9	21 7 50	0 24 15	23 47 44	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
62.	2 43 23	21 28 36	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
64.	2 16 25	21 55 34	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
66.	1 37 0	22 34 59	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
68.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
70.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
72.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
74.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
76.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
78.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
80.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
82.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
84.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
86.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3
88.	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 0 0	24 0 0	0 3 2	24 3

TABLE II.-- SOLAR DECLINATION AND EQUATION OF TIME (1960-1964)

1960	Declination ° ' "	Equation ' "	1961	Declination ° ' "	Equation ' "	1962	Declination ° ' "	Equation ' "	1963	Declination ° ' "	Equation ' "	1964	Declination ° ' "	Equation ' "
1/1	-23 03 26.7	-3 01.84	1/1	-22 59 51.4	-3 22.42	1/1	-23 01 04.2	-3 14.49	1/1	-23 02 16.9	-3 07.76	1/1	-23 03 27.9	-2 59.90
1/15	-21 14 54.6	-9 02.49	1/15	-21 06 41.4	-9 17.95	1/15	-21 09 24.7	-9 12.64	1/15	-21 12 08.1	-9 05.91	1/15	-21 14 48.2	-9 00.66
2/1	-17 17 34.2	-13 30.55	2/1	-17 04 54.1	-13 36.08	2/1	-17 09 03.1	-13 32.77	2/1	-17 13 17.0	-13 30.99	2/1	-17 17 28.8	-13 27.65
2/15	-12 54 51.4	-14 17.39	2/15	-12 39 21.5	-14 15.15	2/15	-12 44 26.8	-14 15.20	2/15	-12 49 31.9	-14 14.74	2/15	-12 54 32.6	-14 15.26
3/1	-7 28 14.7	-12 31.11	3/1	-7 33 52.7	-12 33.25	3/1	-7 39 33.7	-12 34.59	3/1	-7 45 03.0	-12 38.05	3/1	-7 27 55.0	-12 28.15
3/15	-2 01 13.0	-9 06.95	3/15	-2 07 02.2	-9 10.56	3/15	-2 12 50.6	-9 14.37	3/15	-2 18 38.8	-9 17.91	3/15	-2 00 45.5	-9 04.86
4/1	4 39 11.3	-4 02.74	4/1	4 33 28.8	-4 06.33	4/1	4 27 45.0	-4 09.77	4/1	4 22 15.0	-4 15.36	4/1	4 39 38.1	-4 00.15
4/15	9 52 02.8	-0 08.50	4/15	9 46 48.1	-0 12.19	4/15	9 41 35.3	-0 15.71	4/15	9 36 23.1	-0 19.40	4/15	9 52 37.2	-0 07.79
5/1	15 09 42.2	2 52.78	5/1	15 05 14.4	2 51.83	5/1	15 00 47.4	2 50.43	5/1	14 56 31.8	2 46.80	5/1	15 10 10.6	2 54.34
5/15	12 55 52.9	3 44.02	5/15	12 52 24.8	3 44.22	5/15	12 49 00.7	3 44.01	5/15	12 45 35.5	3 43.52	5/15	12 56 21.9	3 43.68
6/1	22 05 28.0	2 19.98	6/1	22 03 28.6	2 23.18	6/1	22 01 30.2	2 25.22	6/1	21 59 36.5	2 27.35	6/1	22 05 46.0	2 20.47
6/15	23 19 15.0	-0 15.49	6/15	23 18 38.9	-0 12.70	6/15	23 18 04.0	-0 09.88	6/15	23 17 26.3	-0 07.47	6/15	23 19 27.1	-0 17.04
7/1	23 05 28.8	-3 39.37	7/1	23 06 29.8	-3 35.77	7/1	23 07 29.0	-3 33.22	7/1	23 08 27.2	-3 32.12	7/1	23 05 28.5	-3 39.35
7/15	21 29 03.7	-5 43.02	7/15	21 31 21.3	-5 47.29	7/15	21 33 40.7	-5 45.94	7/15	21 35 56.9	-5 44.64	7/15	21 28 51.7	-5 49.70
8/1	17 57 35.0	-6 15.48	8/1	18 00 47.0	-6 16.01	8/1	18 04 26.7	-6 17.33	8/1	18 08 04.1	-6 18.95	8/1	17 56 45.1	-6 15.19
8/15	13 58 13.0	-4 28.21	8/15	14 02 41.4	-4 32.46	8/15	14 07 16.0	-4 35.15	8/15	14 11 49.5	-4 37.69	8/15	13 57 39.7	-4 29.41
9/1	8 11 01.6	-0 04.75	9/1	8 16 17.7	-0 09.54	9/1	8 21 33.0	-0 14.76	9/1	8 26 50.3	-0 00.36	9/1	8 10 27.7	-0 04.14
9/15	2 55 29.8	4 41.24	9/15	3 00 57.2	4 34.24	9/15	3 06 36.0	4 29.40	9/15	3 12 15.8	4 24.74	9/15	2 54 43.8	4 40.47
10/1	-3 17 33.7	10 12.81	10/1	-3 11 57.2	10 07.63	10/1	-3 06 20.7	10 02.88	10/1	-3 00 38.9	9 58.10	10/1	-3 18 13.7	10 13.44
10/15	-8 37 03.6	14 07.67	10/15	-8 31 49.8	14 02.53	10/15	-8 26 23.7	13 59.72	10/15	-8 20 56.2	13 57.04	10/15	-8 37 51.7	14 06.78
11/1	-14 31 12.2	16 22.18	11/1	-14 26 33.8	16 21.44	11/1	-14 21 56.4	16 20.35	11/1	-14 17 13.3	16 20.65	11/1	-14 31 49.0	16 22.28
11/15	-12 33 23.5	15 26.22	11/15	-12 29 46.8	15 27.13	11/15	-12 26 00.7	15 30.46	11/15	-12 22 16.3	15 33.11	11/15	-12 34 00.2	15 24.91
12/1	-21 50 52.7	11 03.66	12/1	-21 48 36.9	11 09.38	12/1	-21 46 47.8	11 14.40	12/1	-21 44 5.7	11 20.47	12/1	-21 51 14.3	11 03.35
12/15	-23 16 57.3	4 59.64	12/15	-23 16 15.4	5 05.87	12/15	-23 15 29.6	5 14.25	12/15	-23 14 49.3	5 21.34	12/15	-23 17 11.5	4 58.20



(a)



(b)

Figure 1.- Geometry of sunrise and sunset at ionospheric heights.

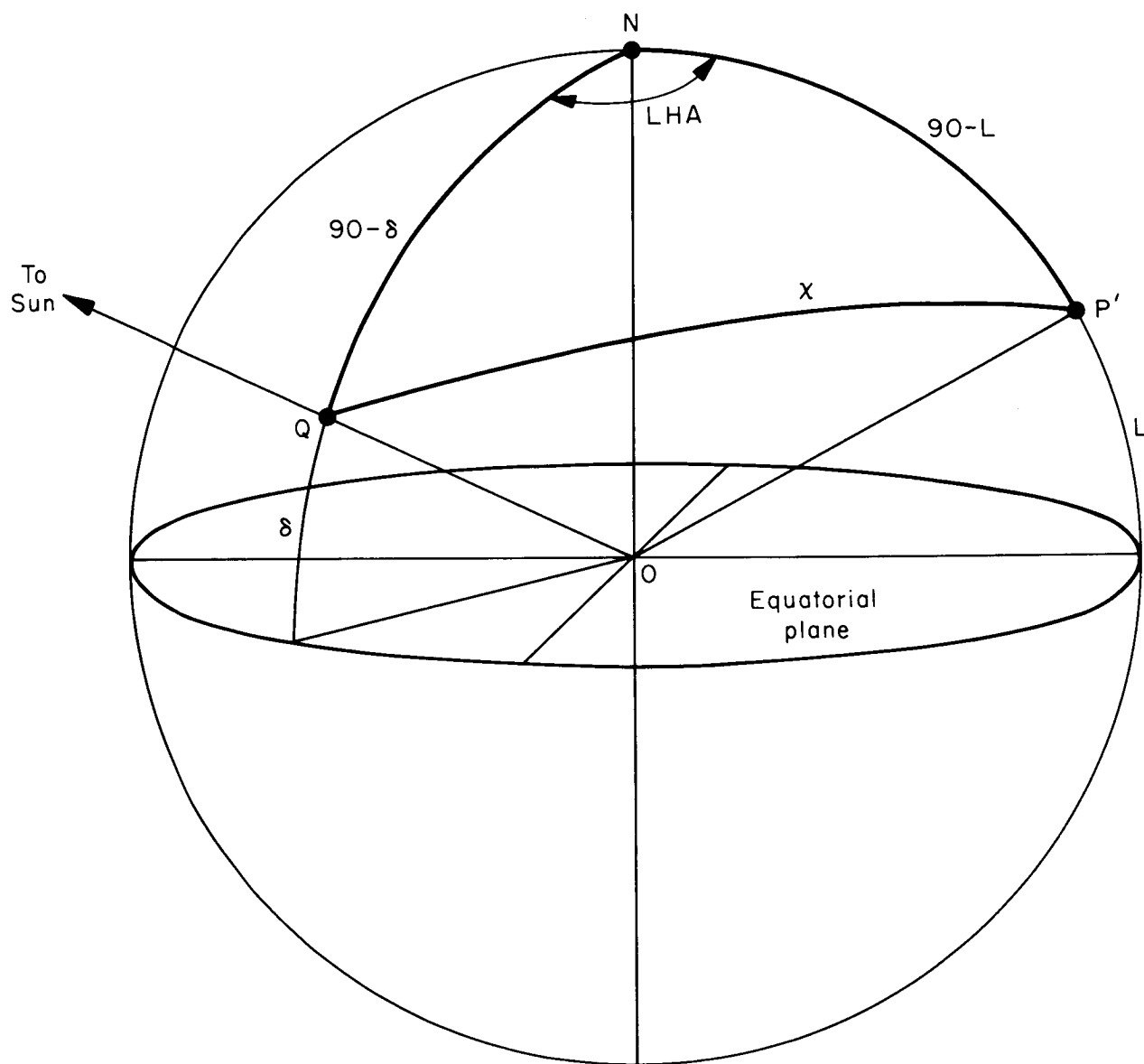


Figure 2.- Local hour angle of sun at sunrise and sunset.

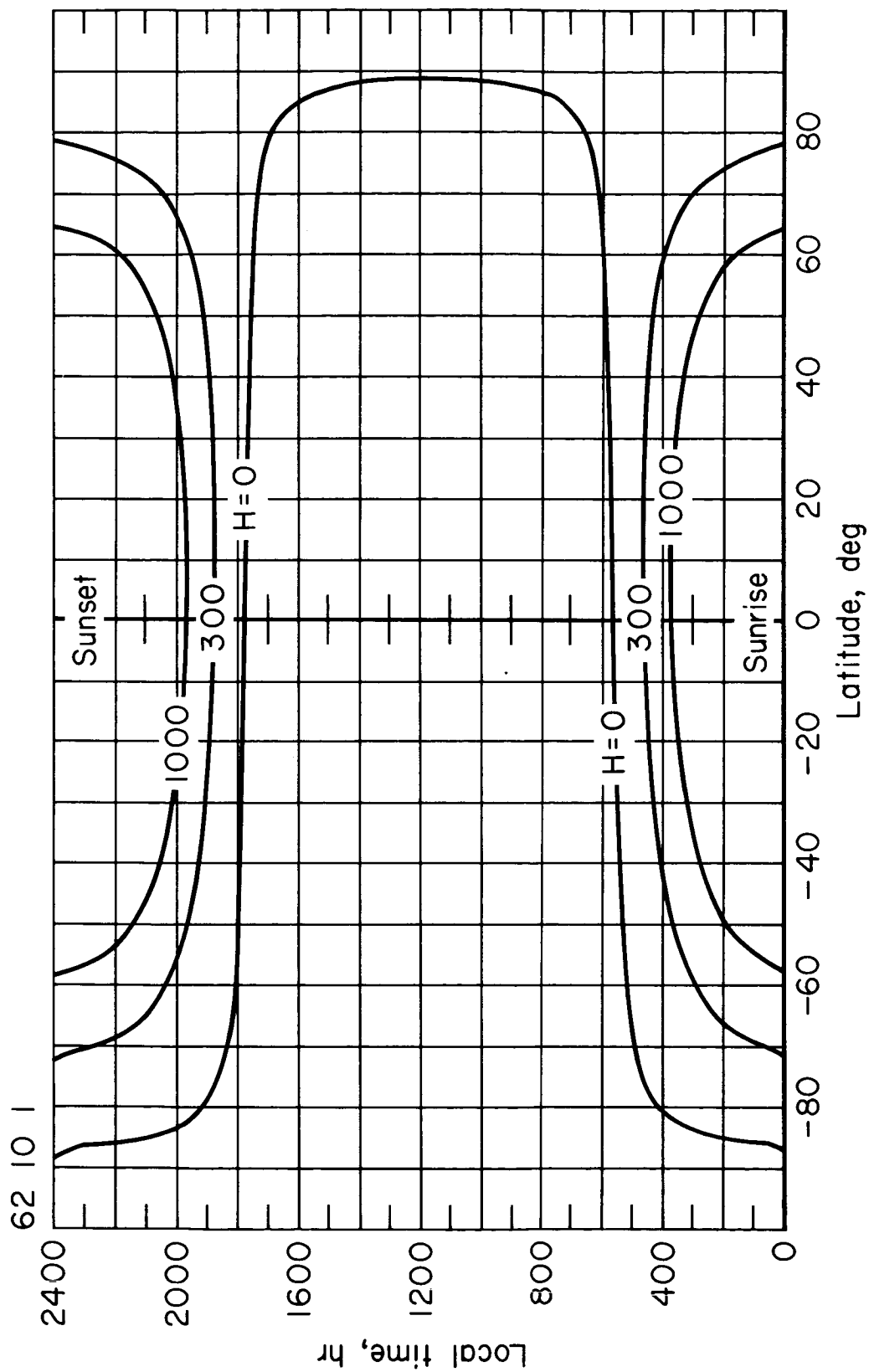


Figure 3.- Cartesian coordinate graphs of local sunrise and sunset times, October 1, 1962.

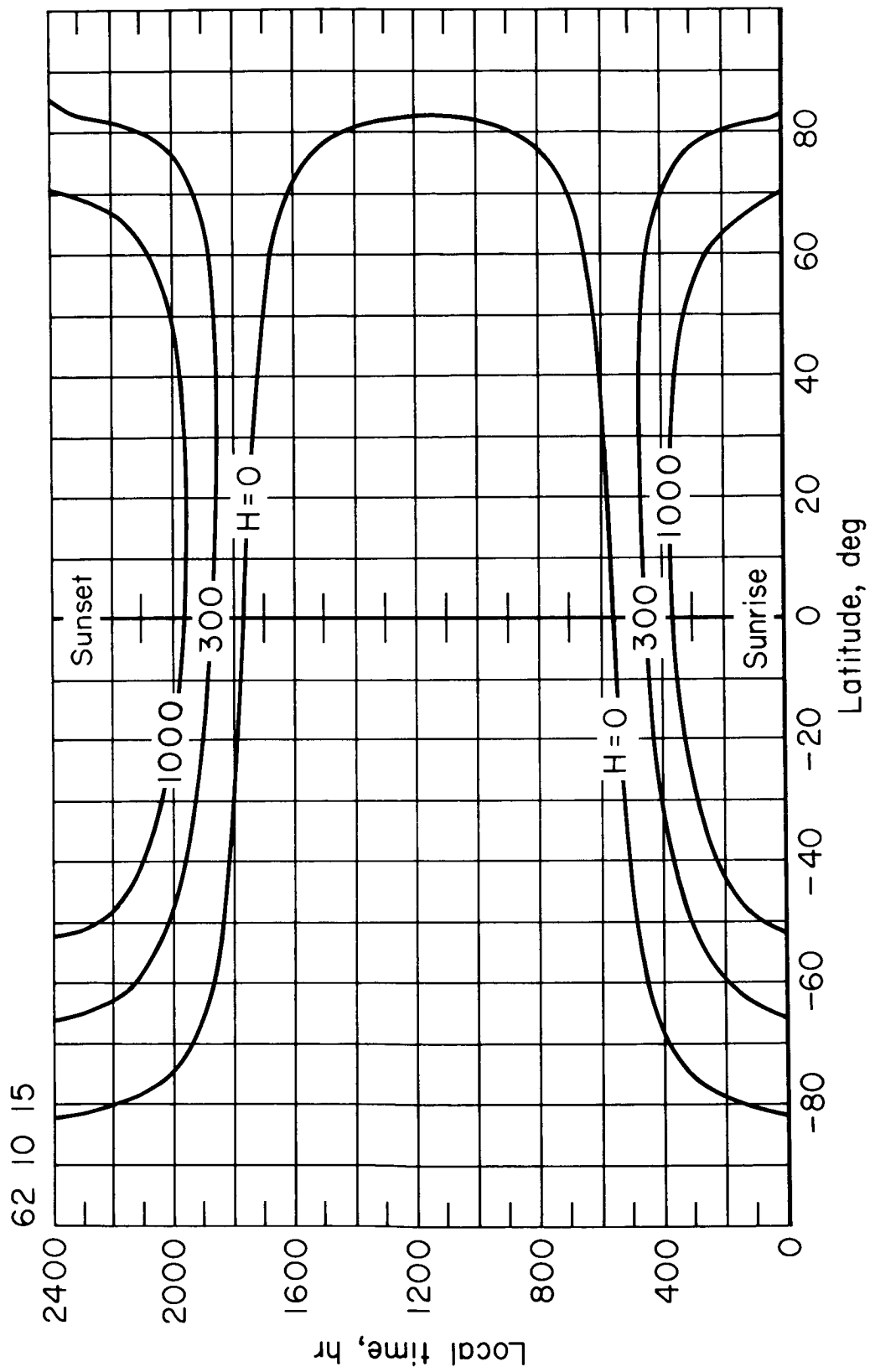


Figure 4.- Cartesian coordinate graphs of local sunrise and sunset times, October 15, 1962.

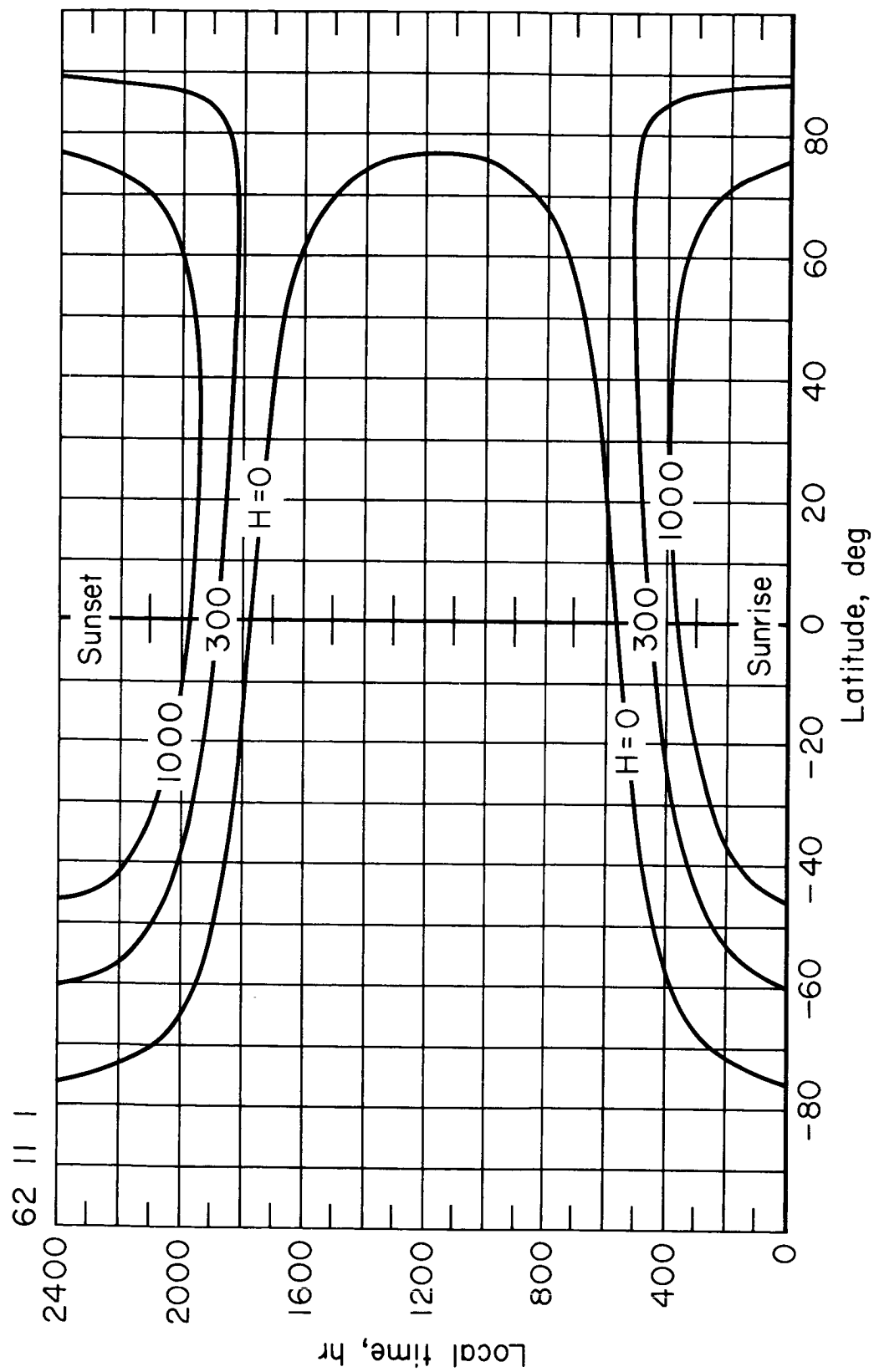


Figure 5.- Cartesian coordinate graphs of local sunrise and sunset times, November 1, 1962.

62 11 15

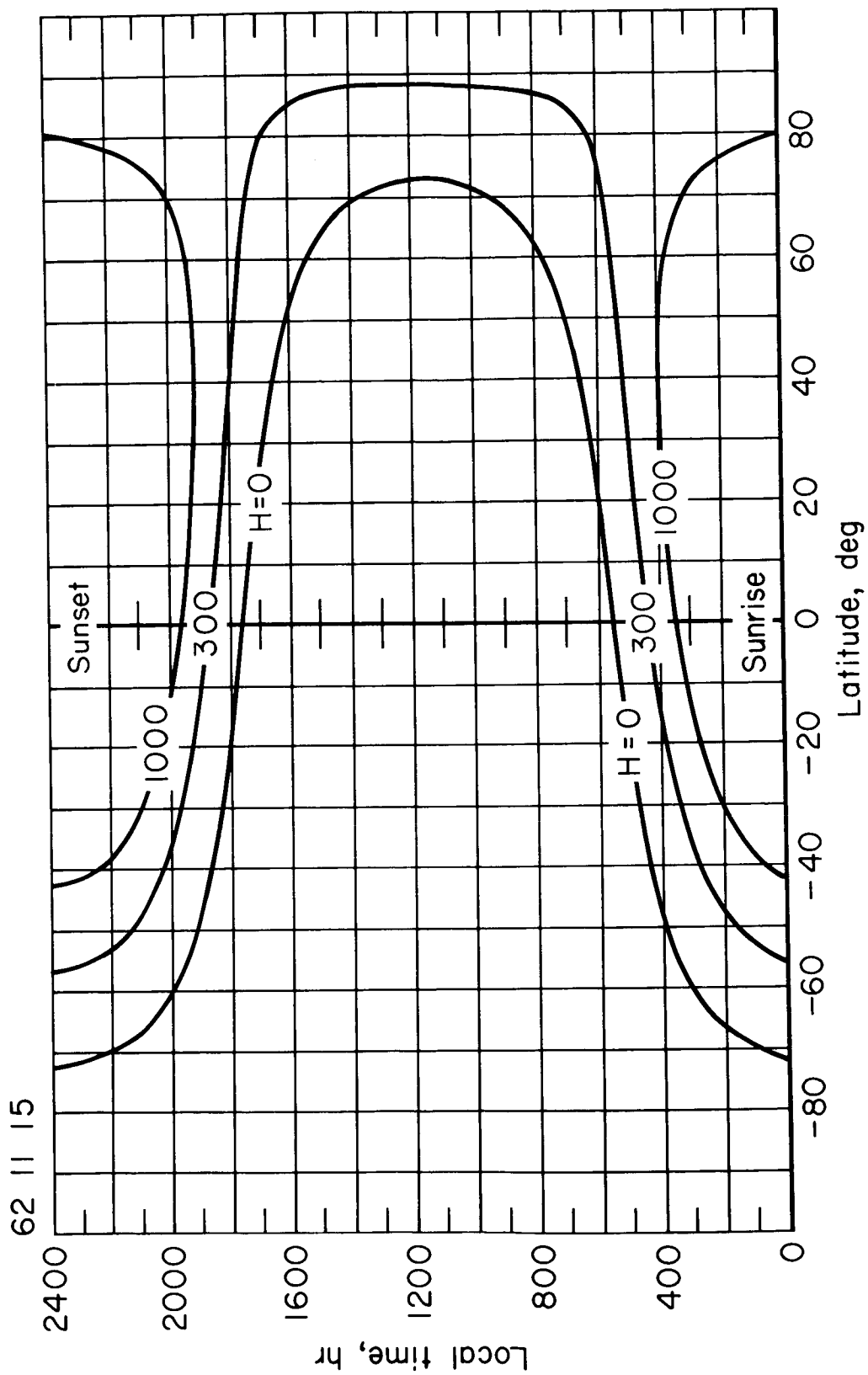


Figure 6.- Cartesian coordinate graphs of local sunrise and sunset times, November 15, 1962.

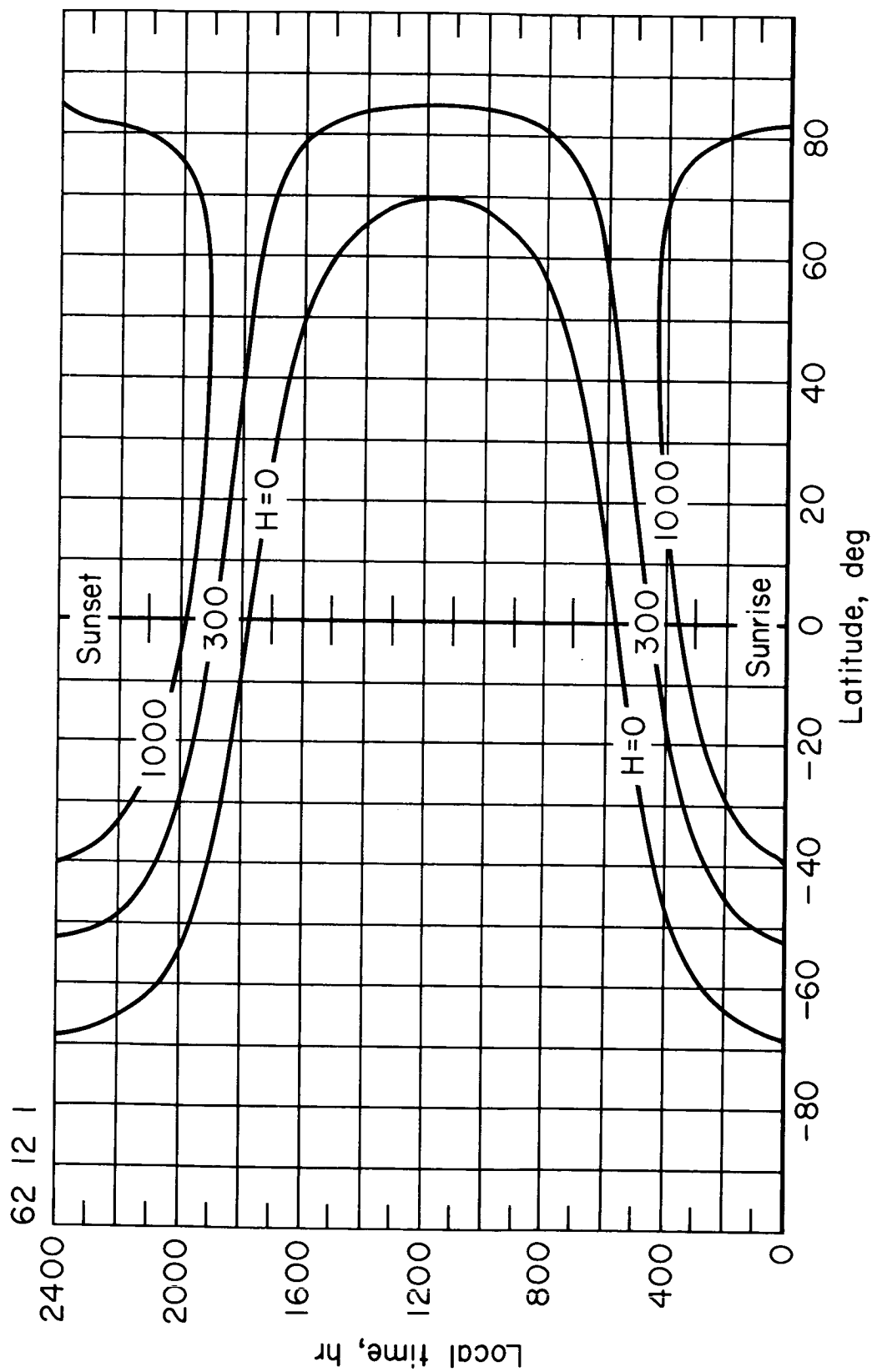


Figure 7.- Cartesian coordinate graphs of local sunrise and sunset times, December 1, 1962.

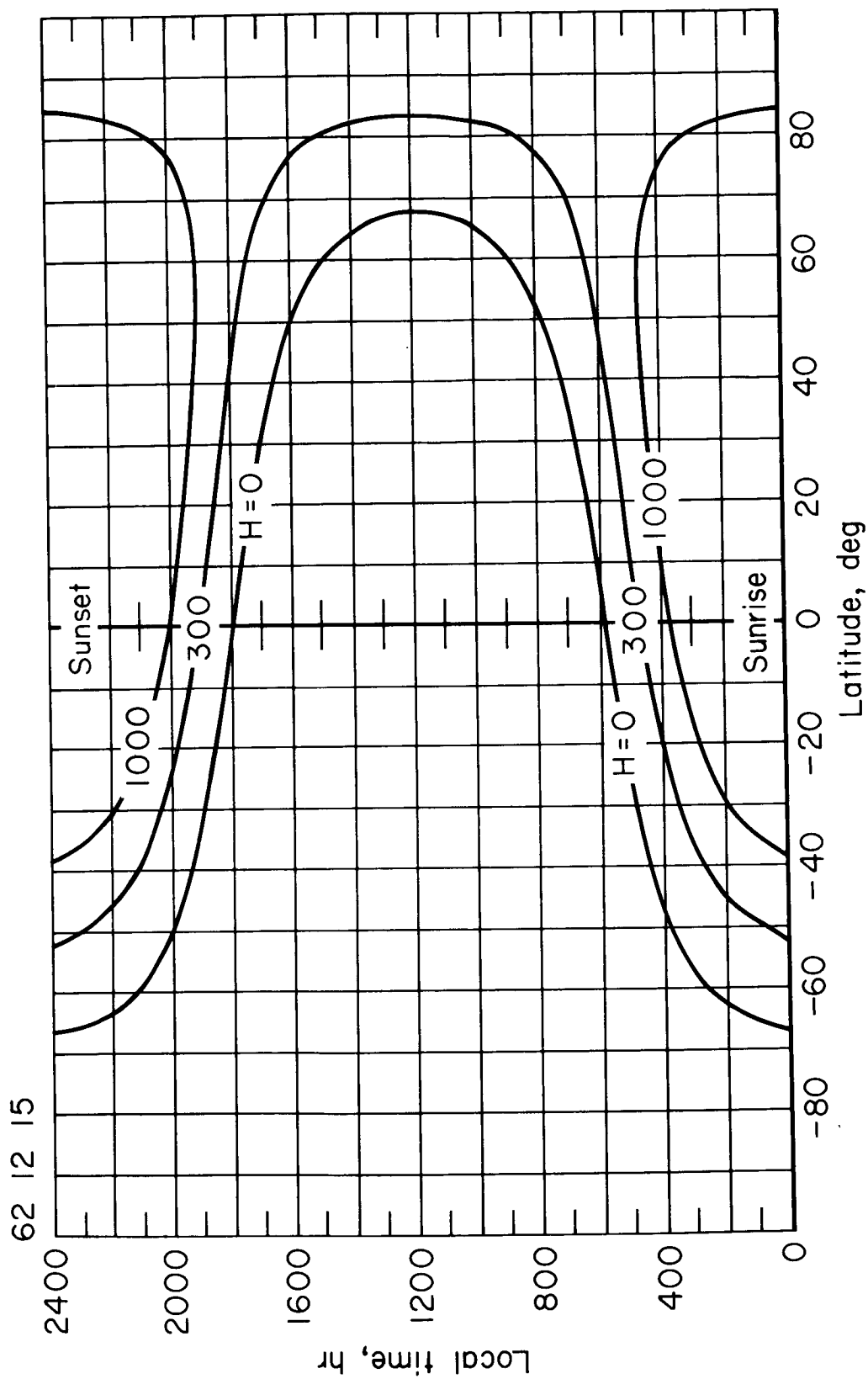


Figure 8.- Cartesian coordinate graphs of local sunrise and sunset times, December 15, 1962.

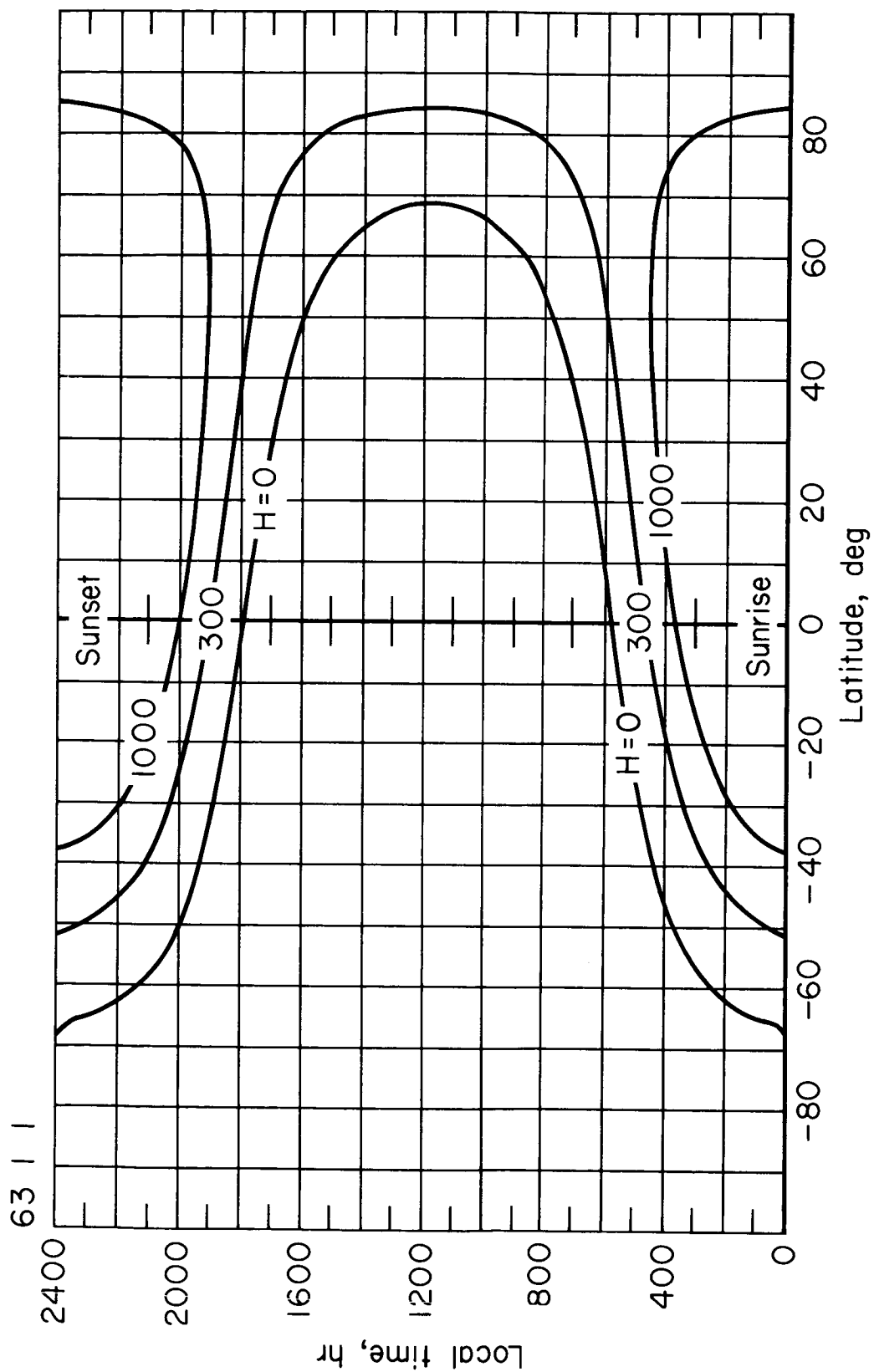


Figure 9.- Cartesian coordinate graphs of local sunrise and sunset times, January 1, 1963.

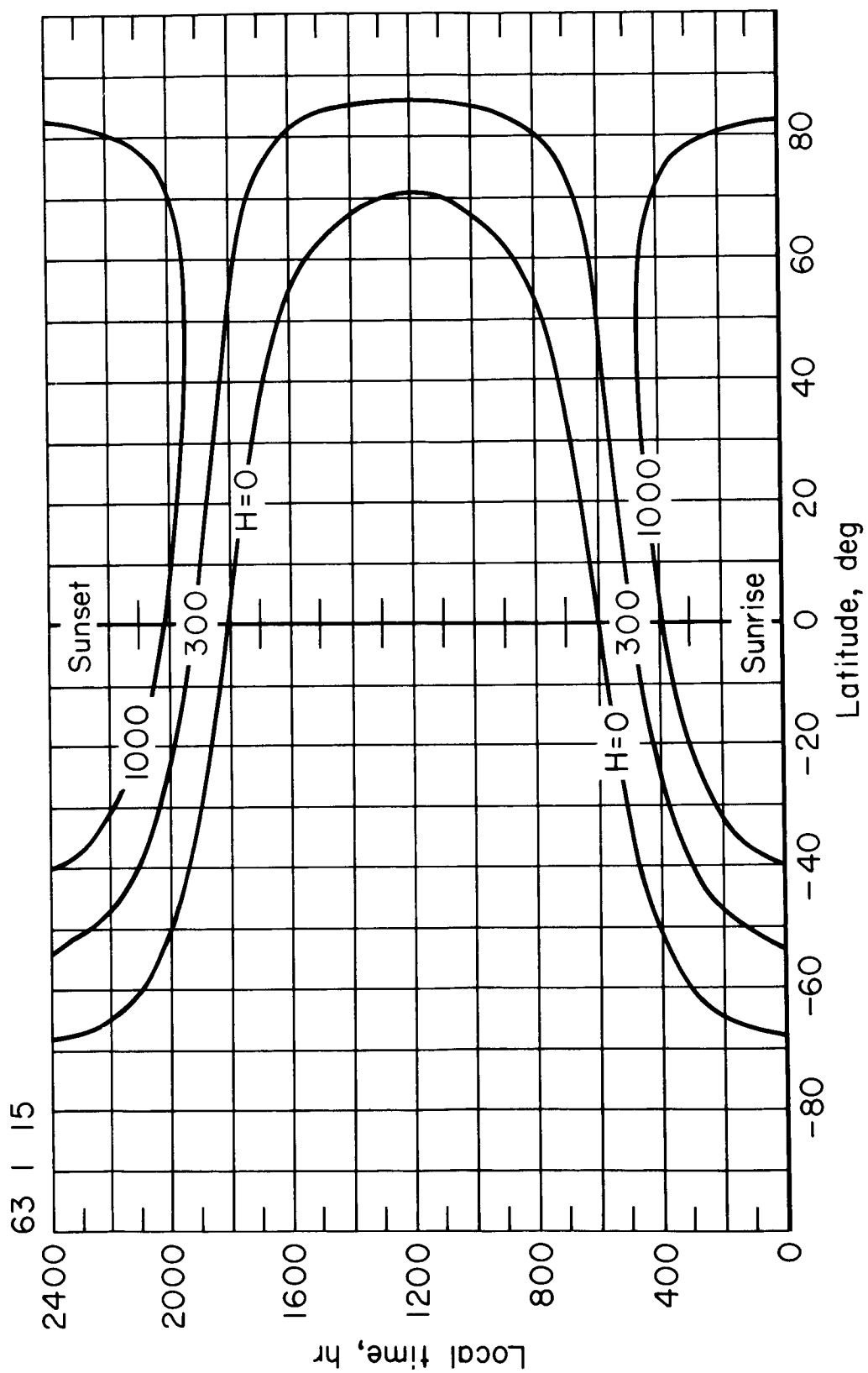


Figure 10.— Cartesian coordinate graphs of local sunrise and sunset times, January 15, 1963.

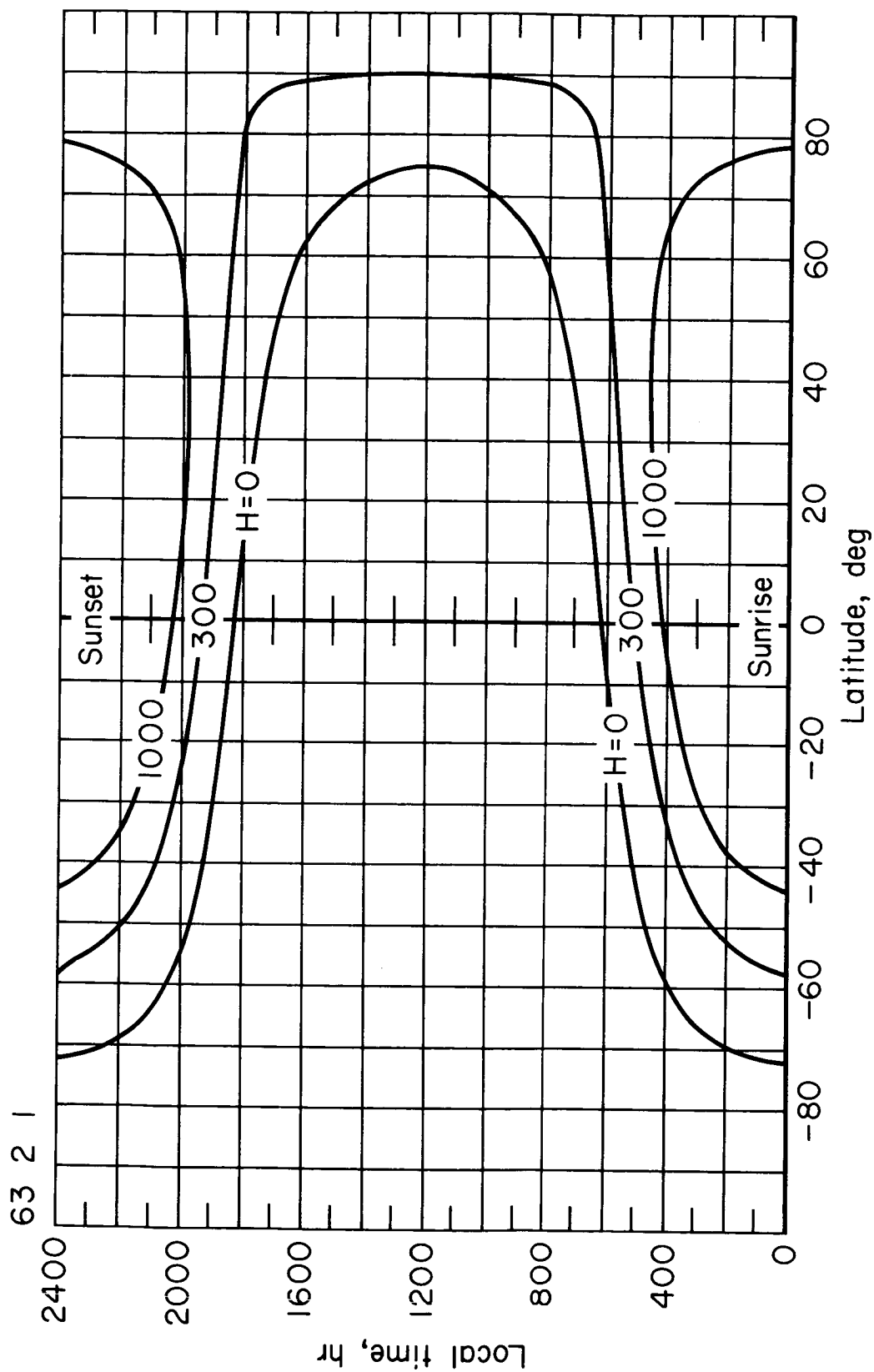


Figure 11.- Cartesian coordinate graphs of local sunrise and sunset times, February 1, 1963.

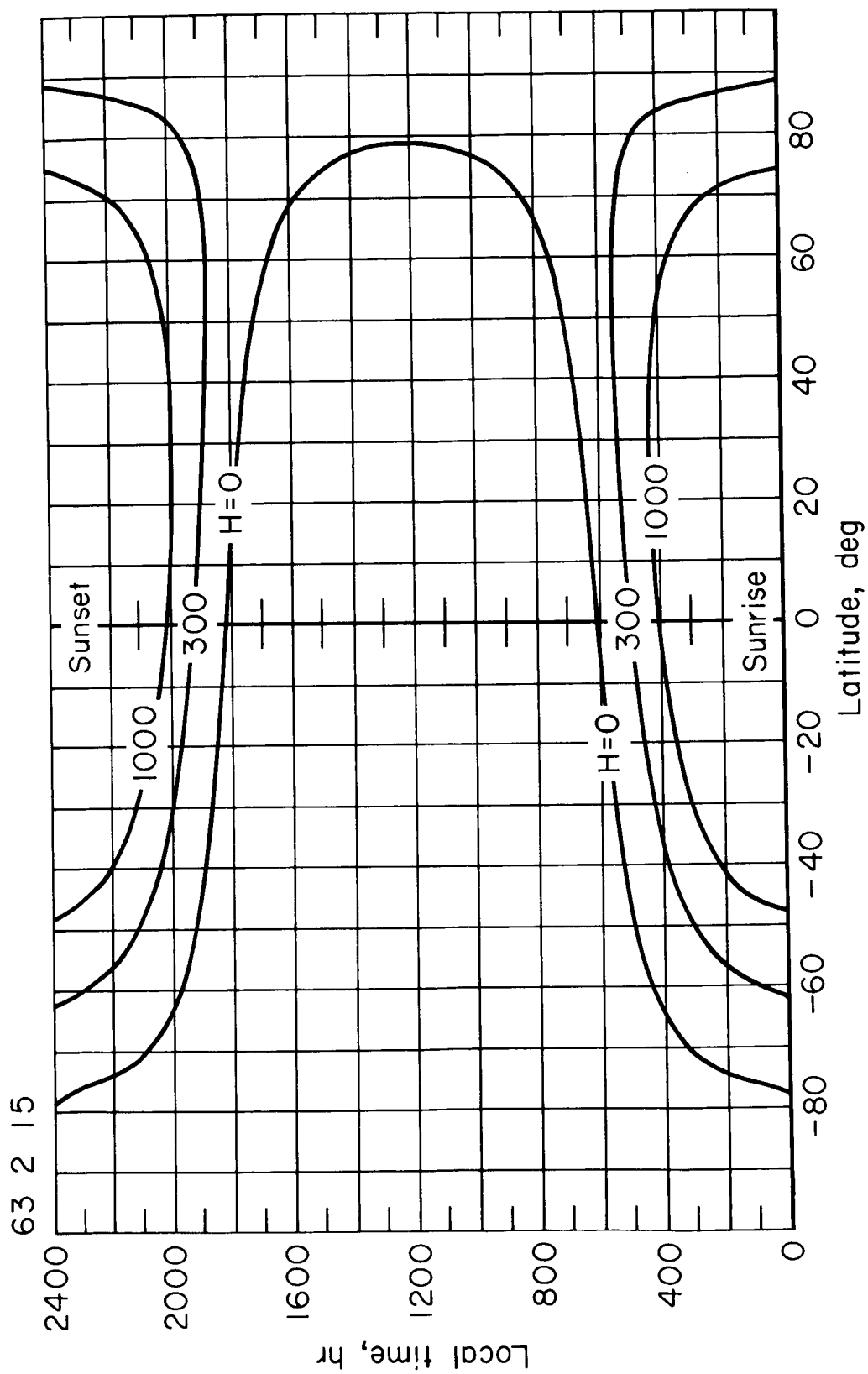


Figure 12.- Cartesian coordinate graphs of local sunrise and sunset times, February 15, 1963.

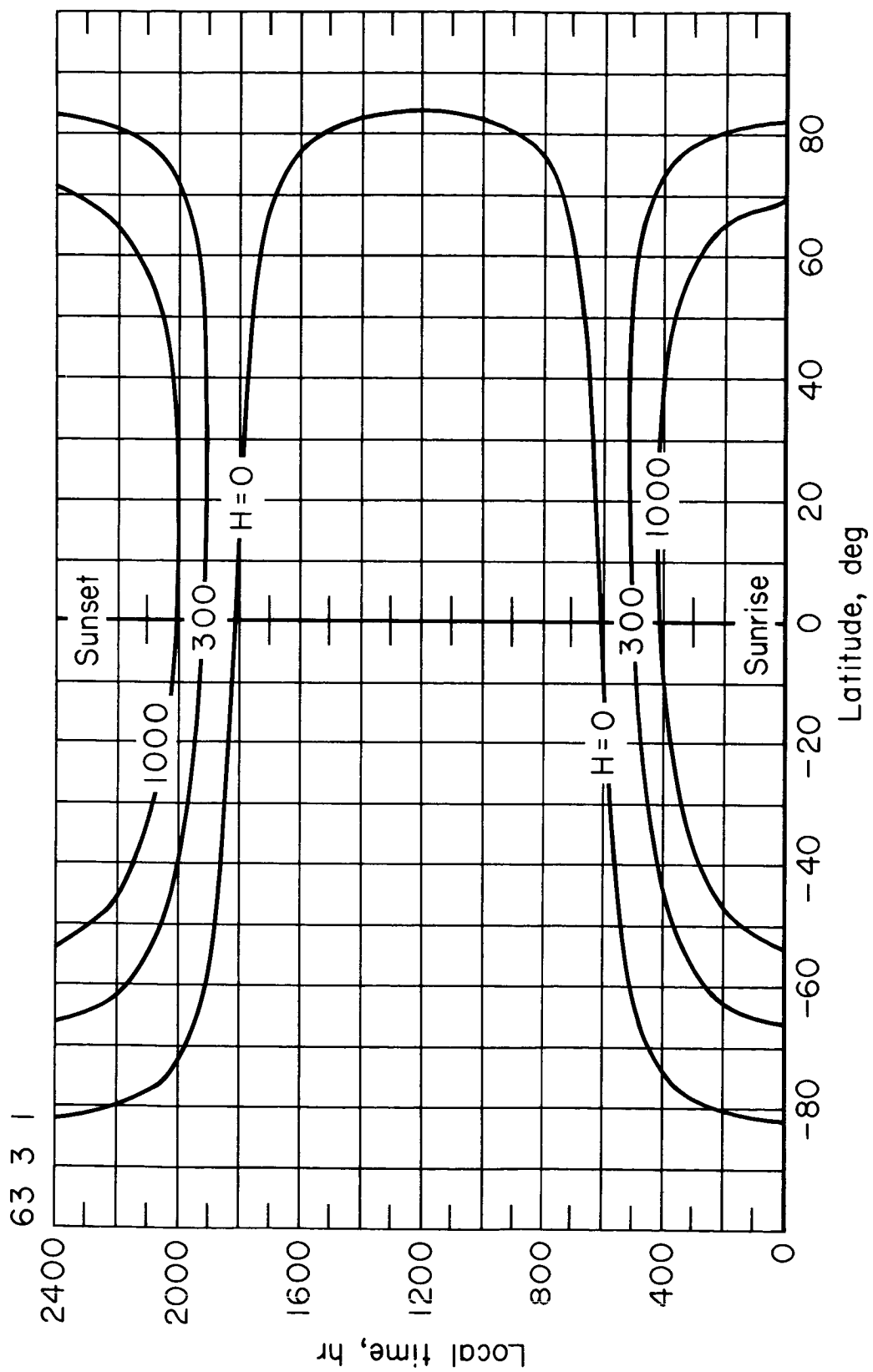


Figure 13.- Cartesian coordinate graphs of local sunrise and sunset times, March 1, 1963.

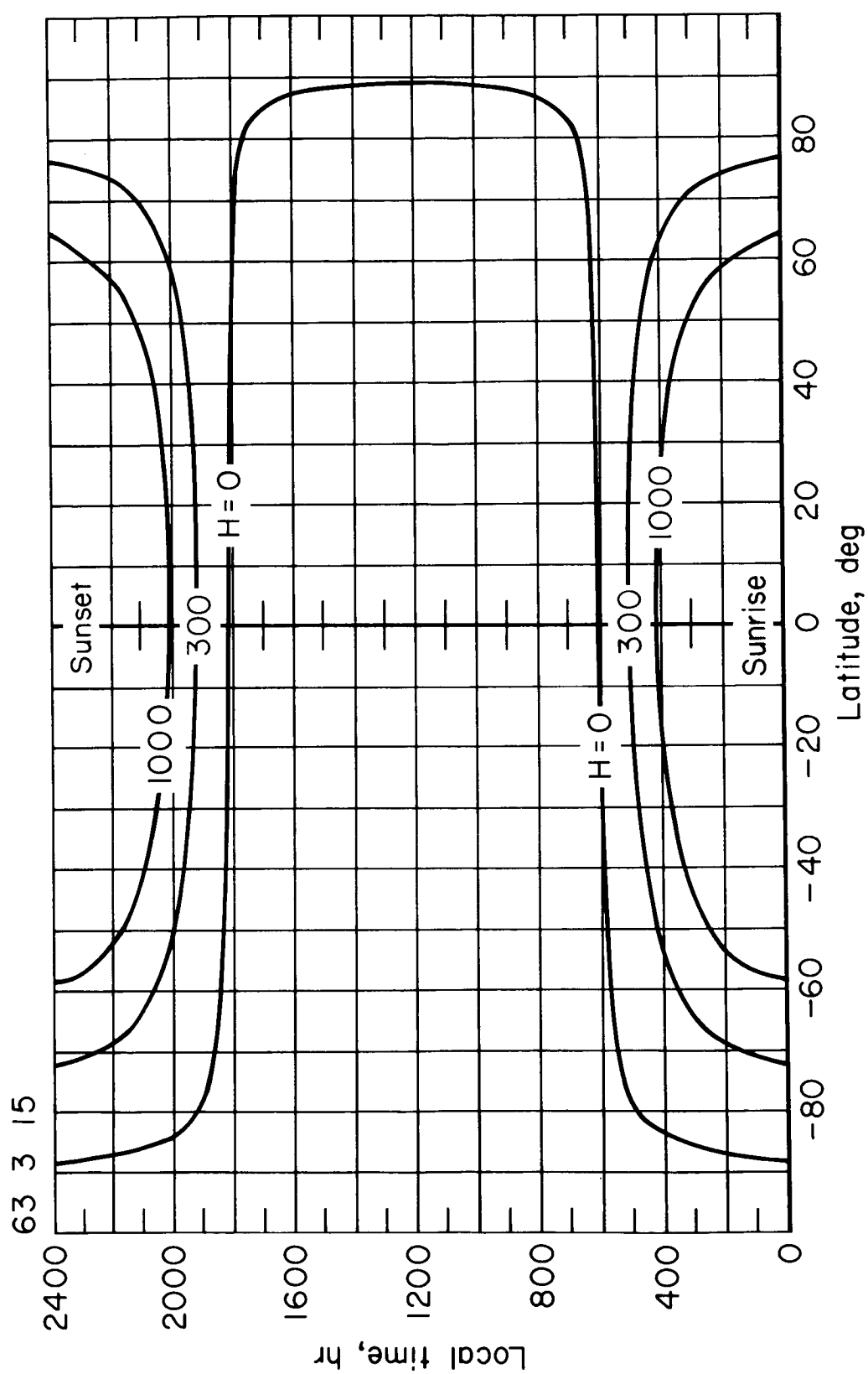


Figure 14.- Cartesian coordinate graphs of local sunrise and sunset times, March 15, 1963.

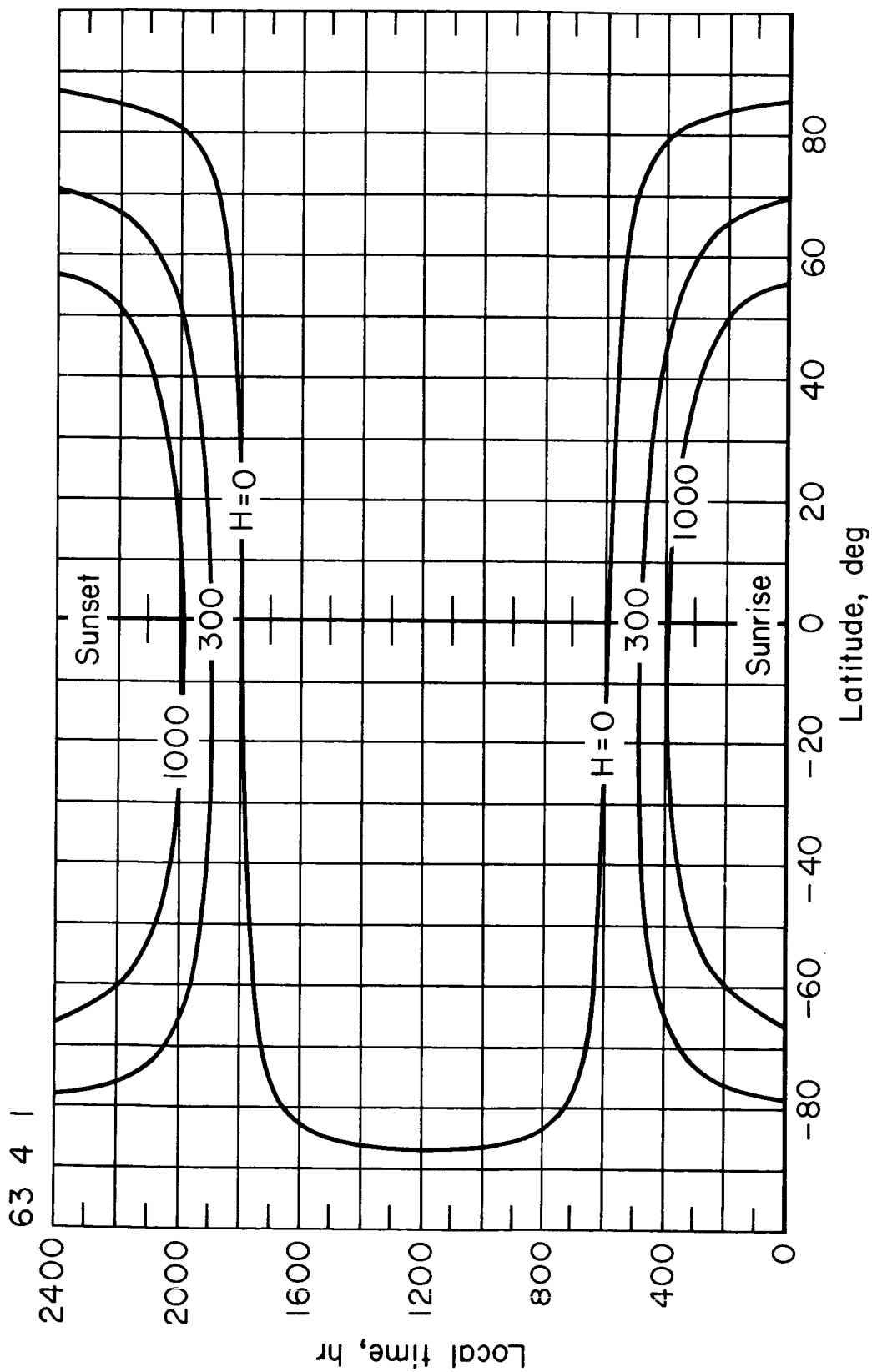


Figure 15.- Cartesian coordinate graphs of local sunrise and sunset times, April 1, 1963.

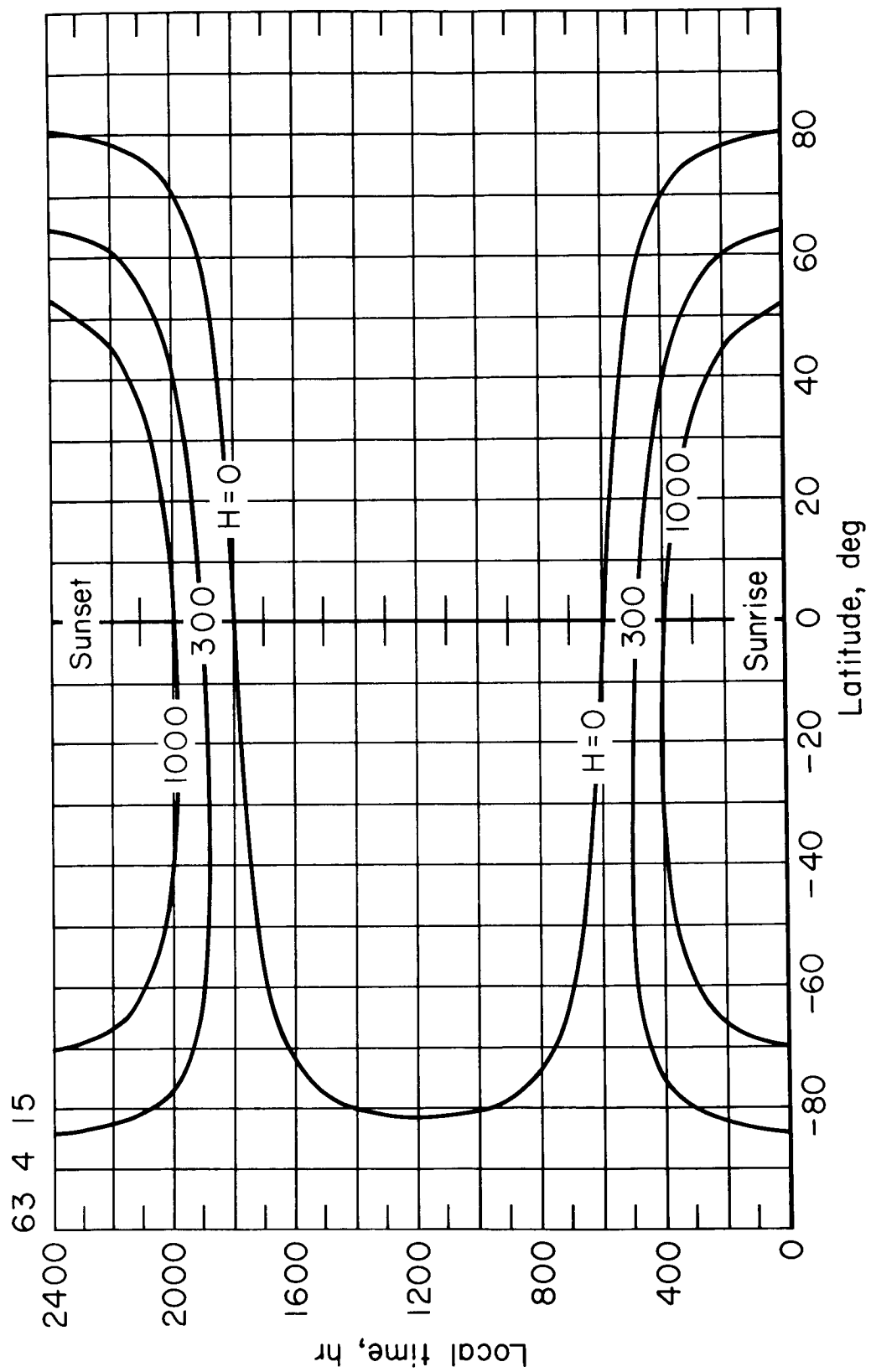


Figure 16.- Cartesian coordinate graphs of local sunrise and sunset times, April 15, 1963.

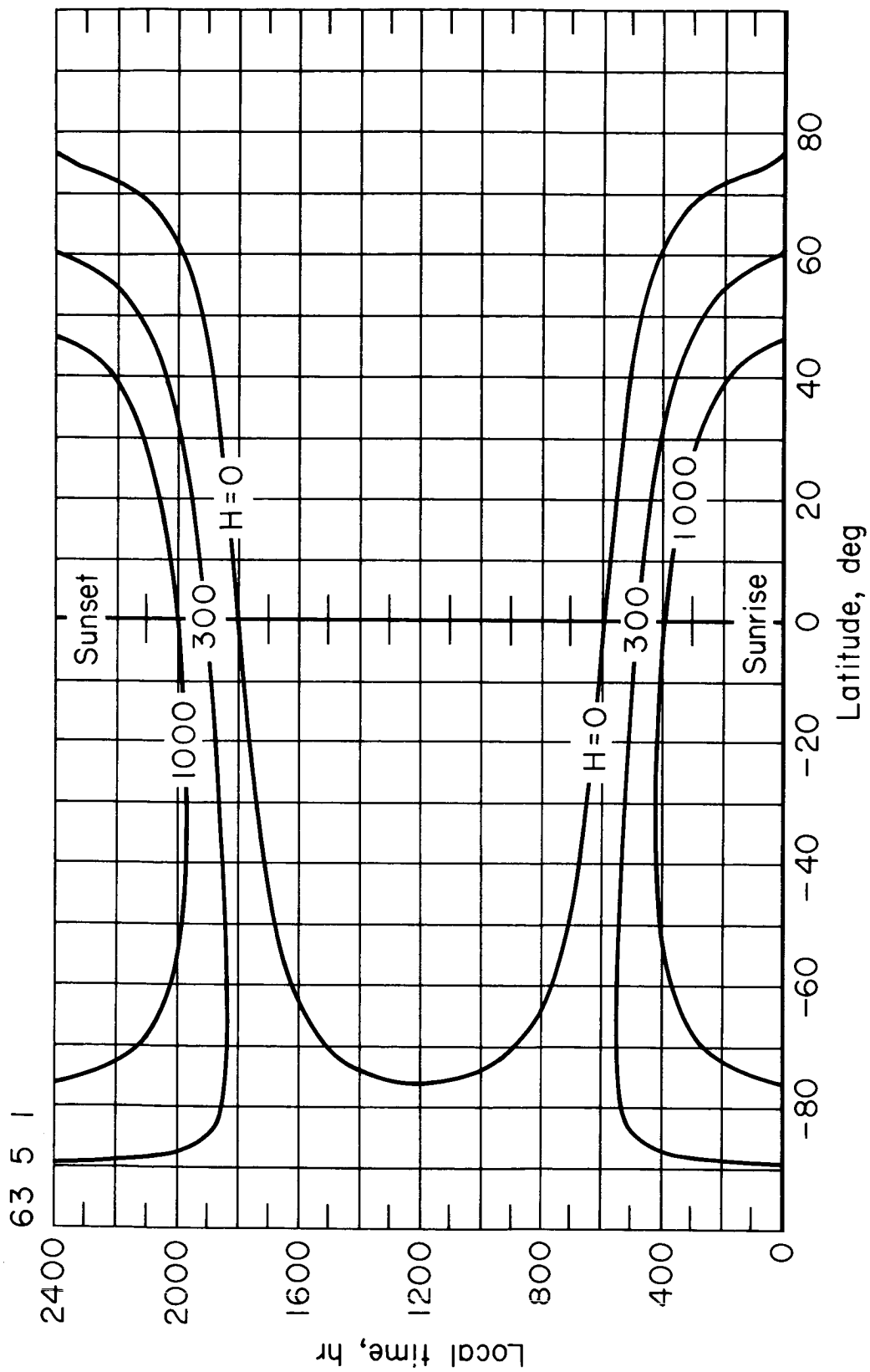


Figure 17.- Cartesian coordinate graphs of local sunrise and sunset times, May 1, 1963.

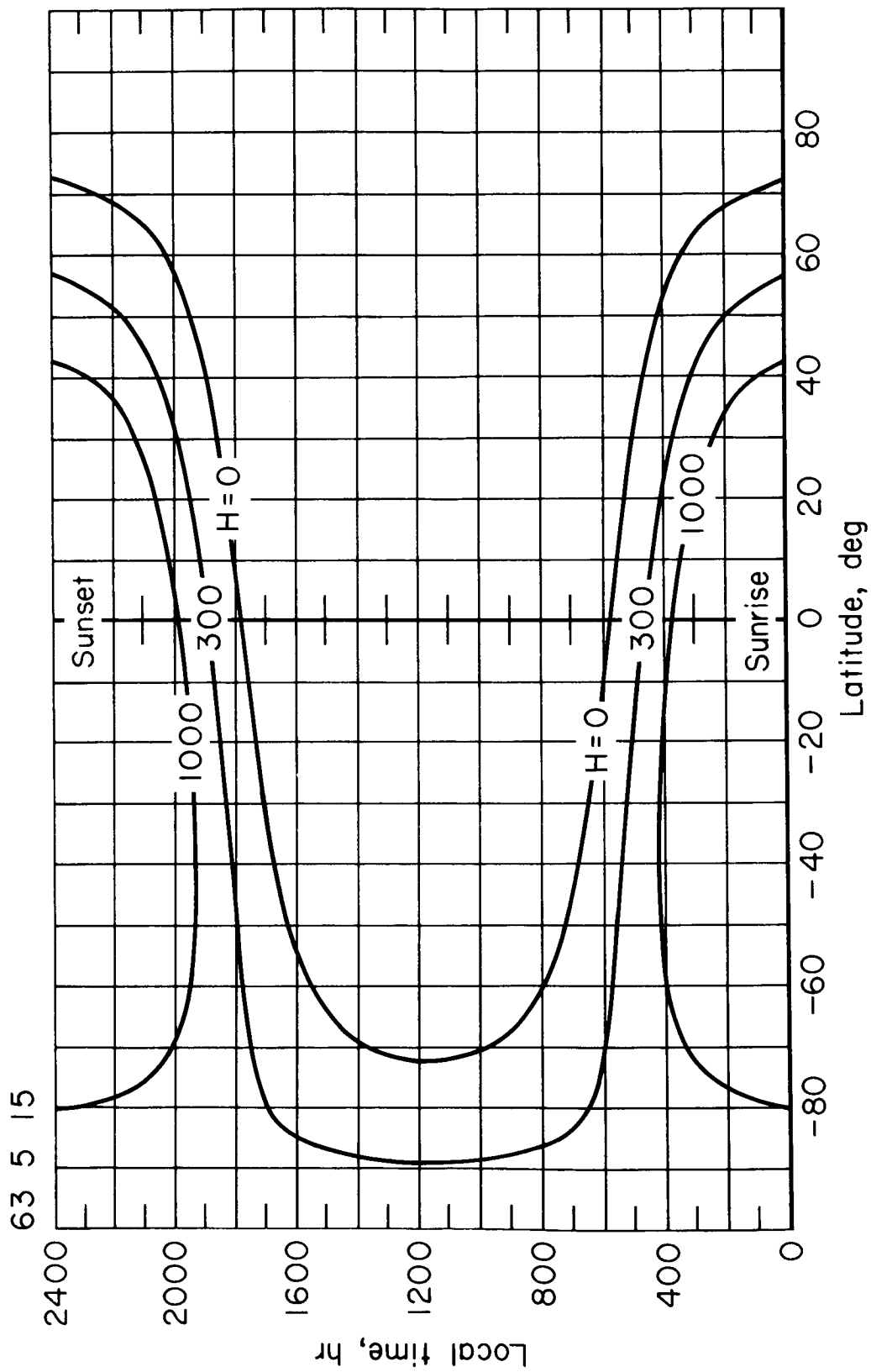


Figure 18.- Cartesian coordinate graphs of local sunrise and sunset times, May 15, 1963.

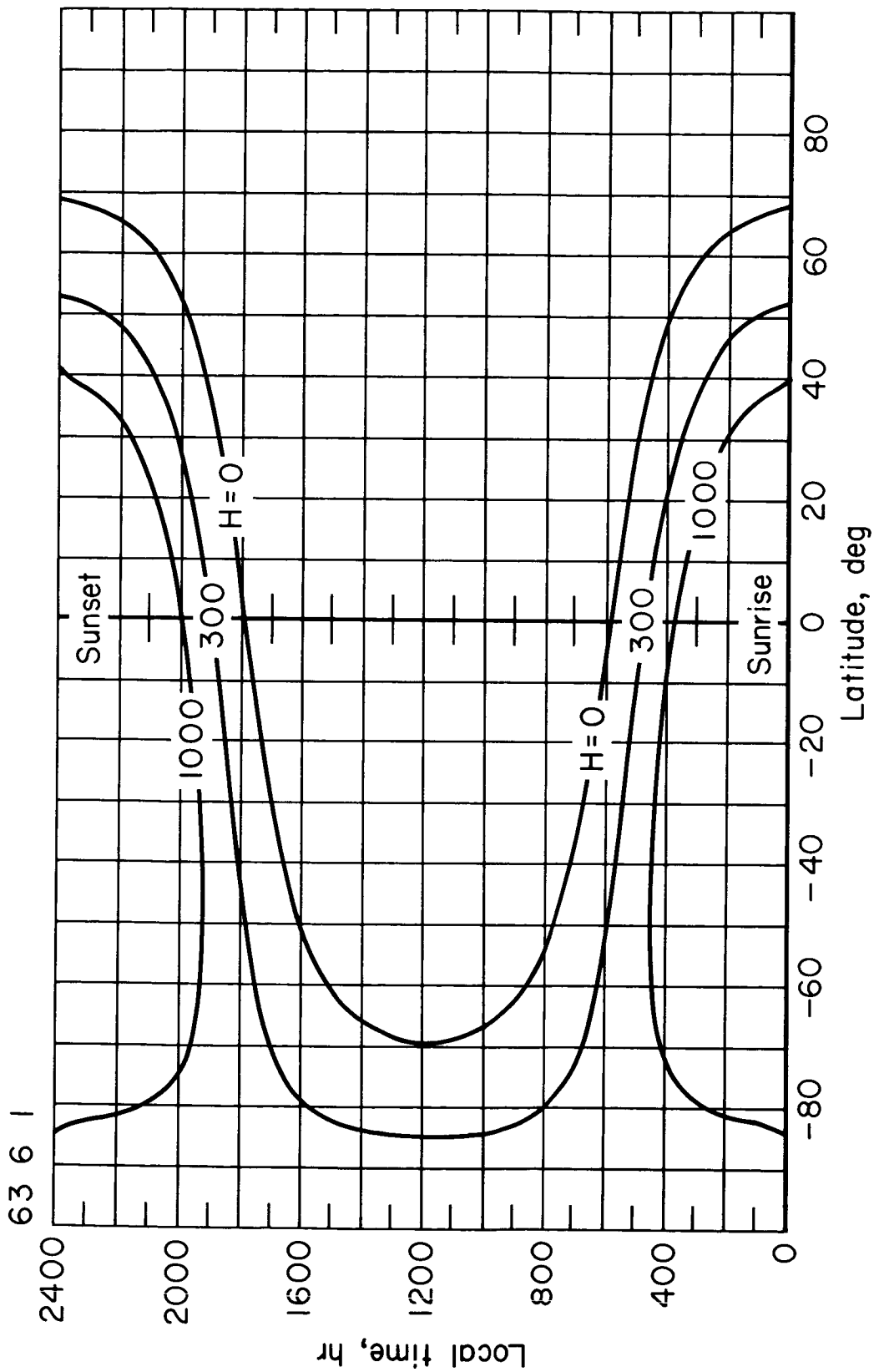


Figure 19.-- Cartesian coordinate graphs of local sunrise and sunset times, June 1, 1963.

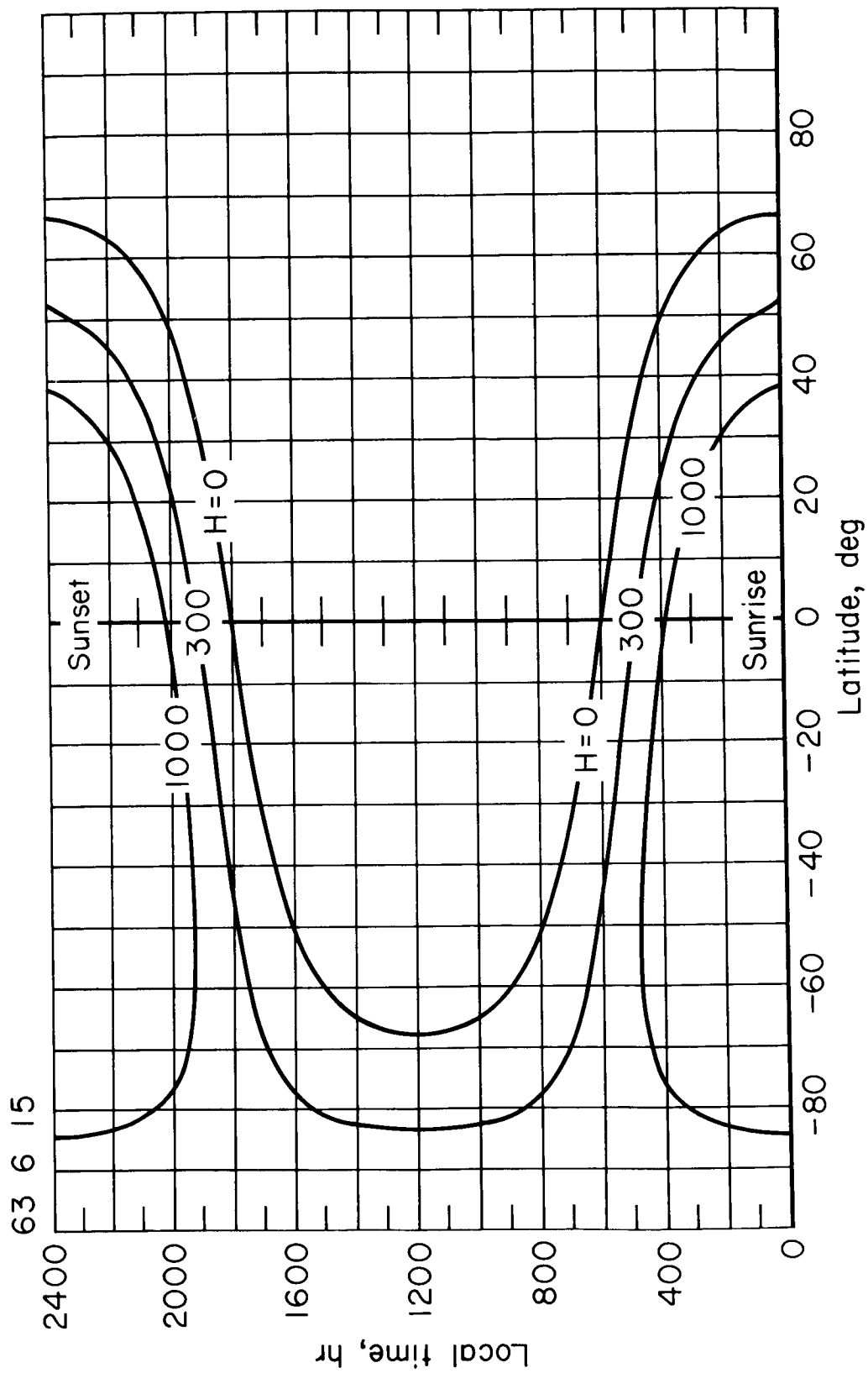


Figure 20.- Cartesian coordinate graphs of local sunrise and sunset times, June 15, 1963.

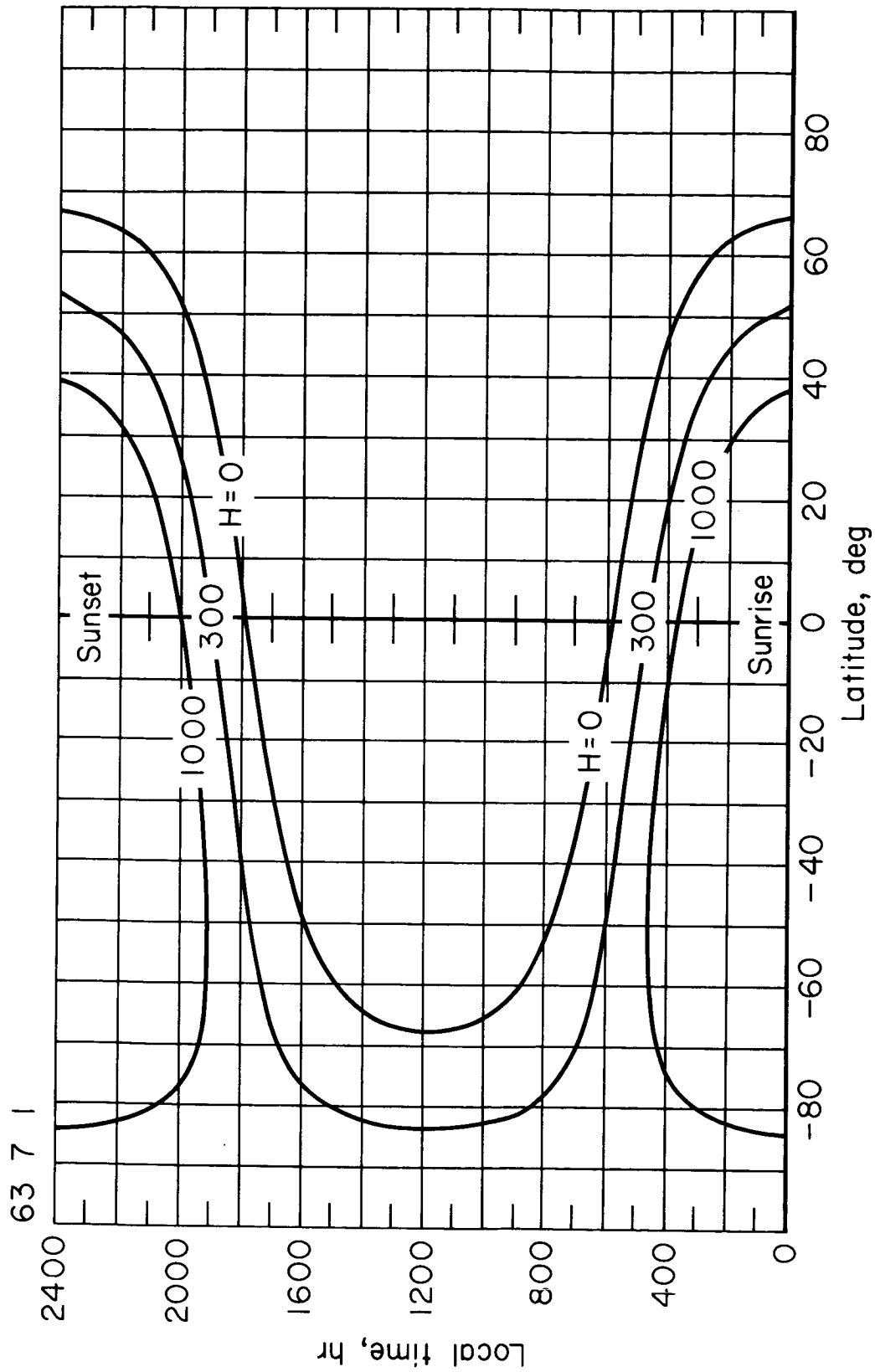


Figure 21.- Cartesian coordinate graphs of local sunrise and sunset times, July 1, 1963.

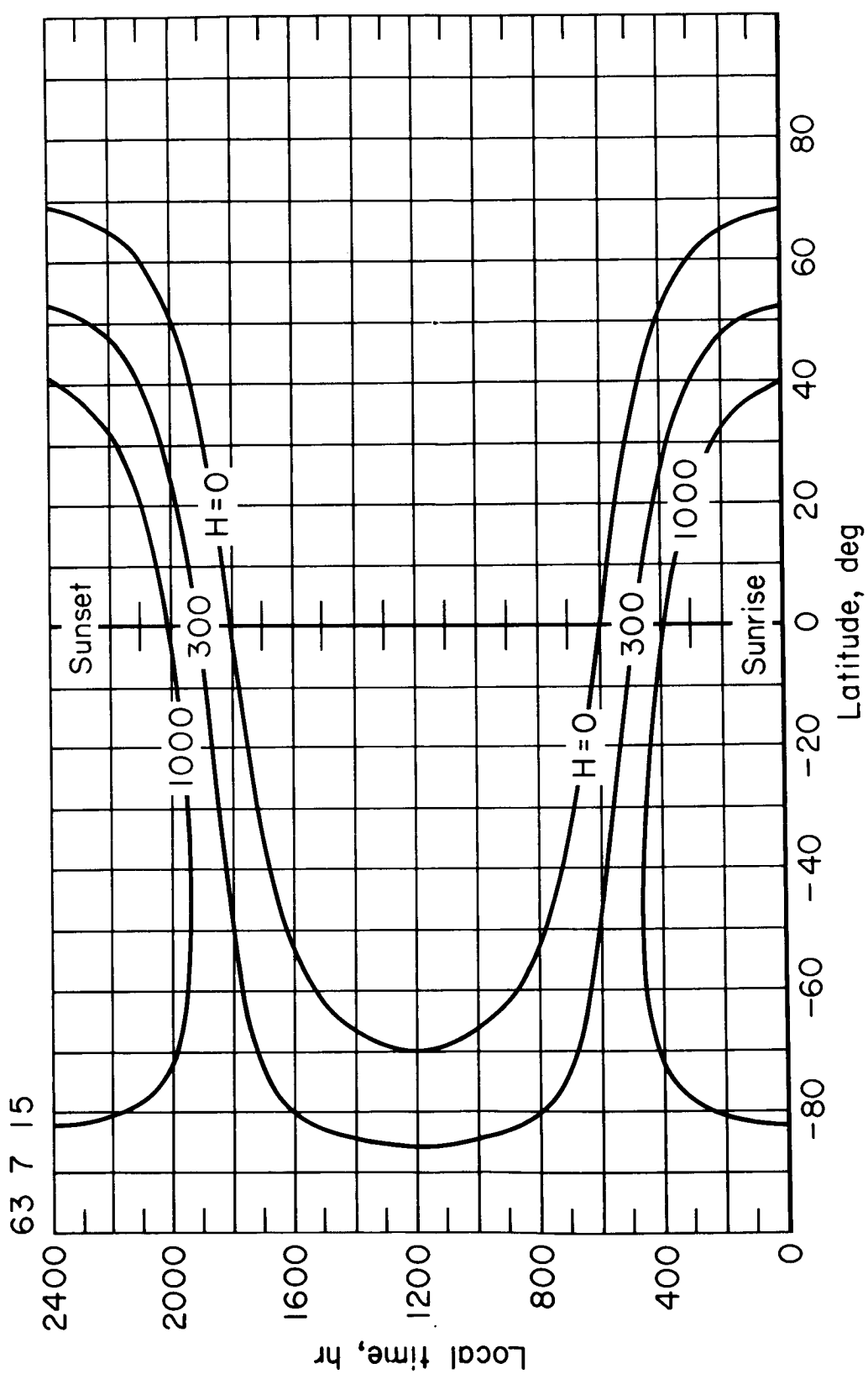


Figure 22.- Cartesian coordinate graphs of local sunrise and sunset times, July 15, 1963.

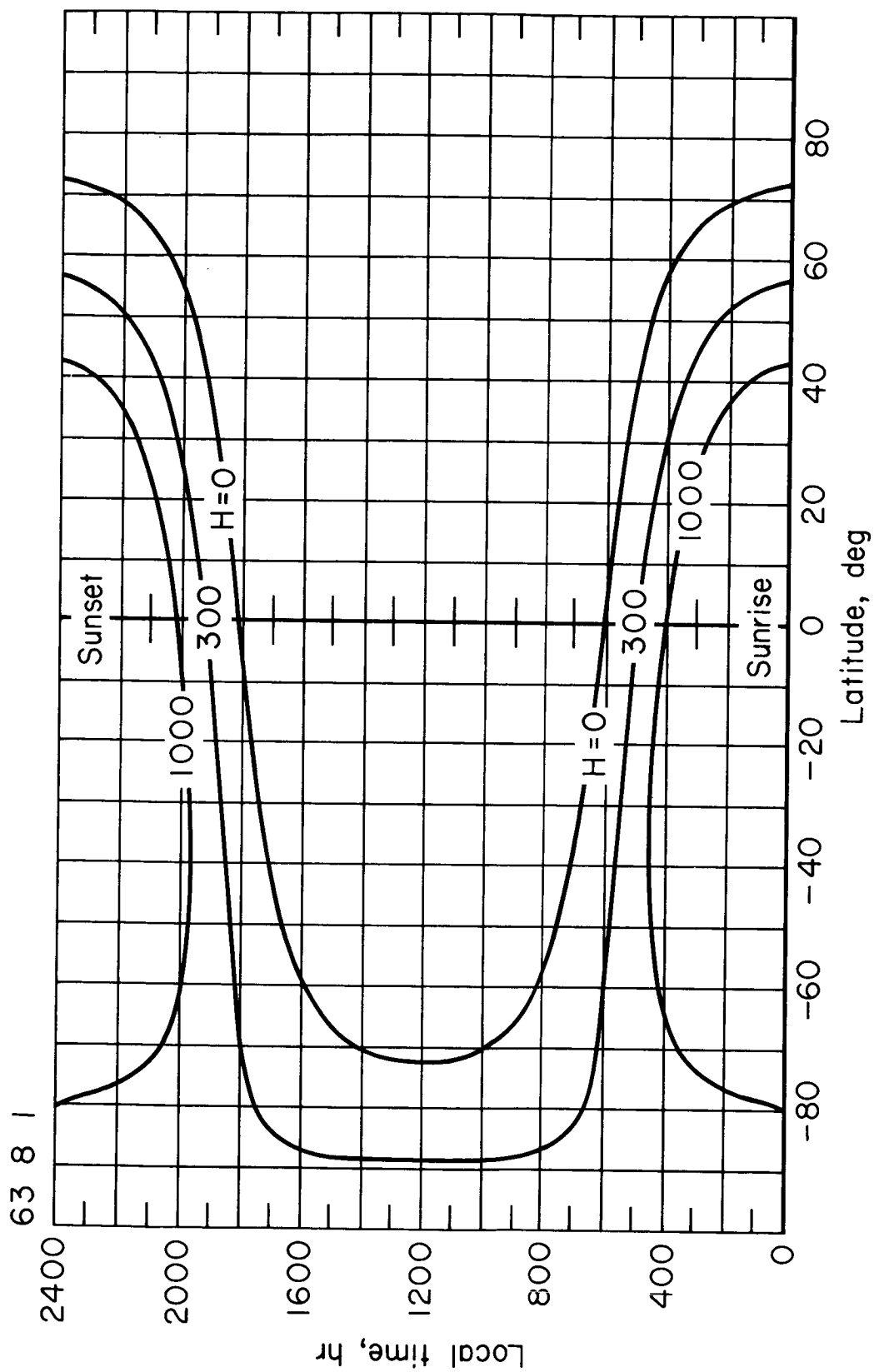


Figure 23.- Cartesian coordinate graphs of local sunrise and sunset times, August 1, 1963.

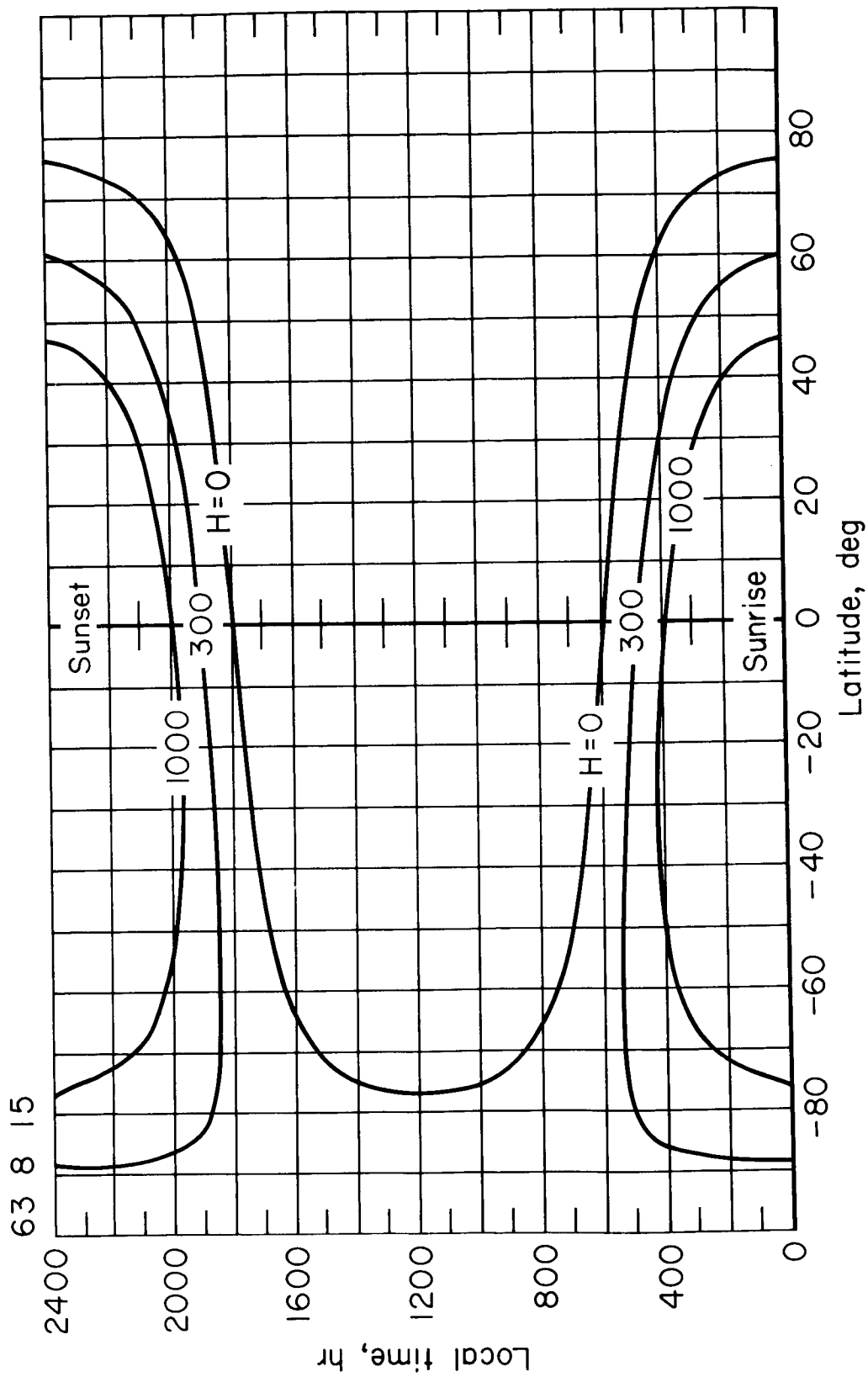


Figure 24.- Cartesian coordinate graphs of local sunrise and sunset times, August 15, 1963.

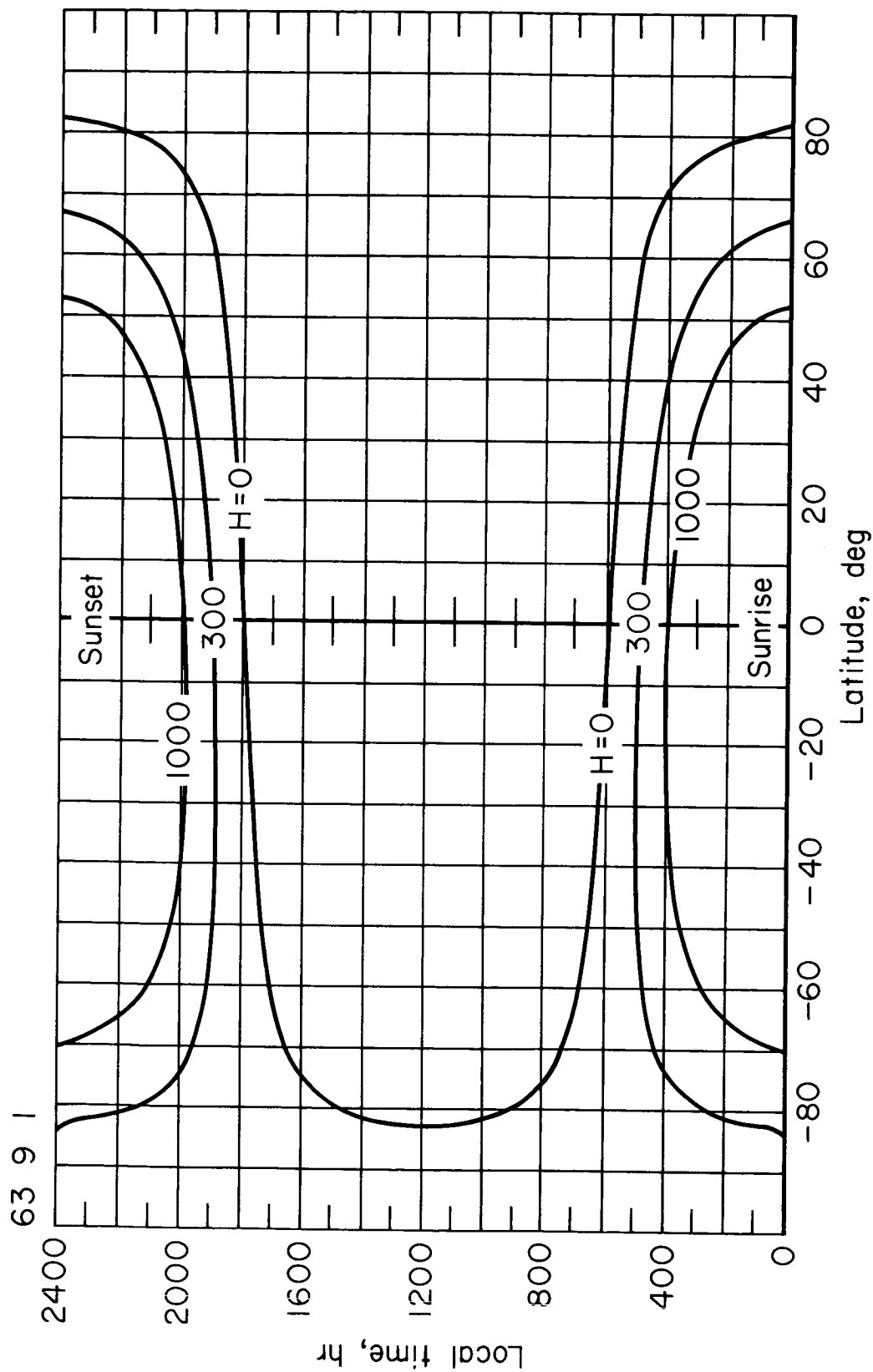


Figure 25.- Cartesian coordinate graphs of local sunrise and sunset times, September 1, 1963.

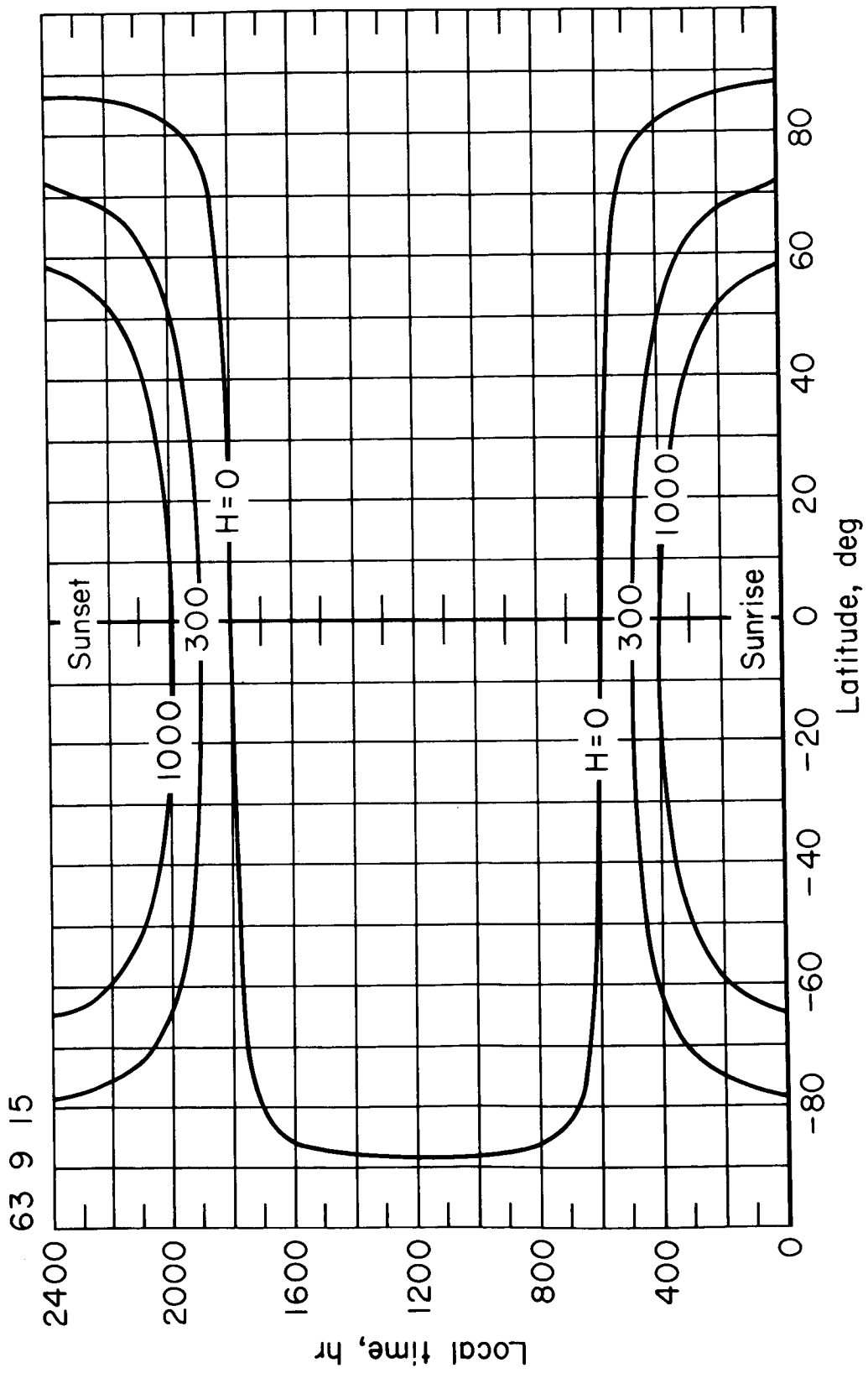


Figure 26.- Cartesian coordinate graphs of local sunrise and sunset times, September 15, 1963.

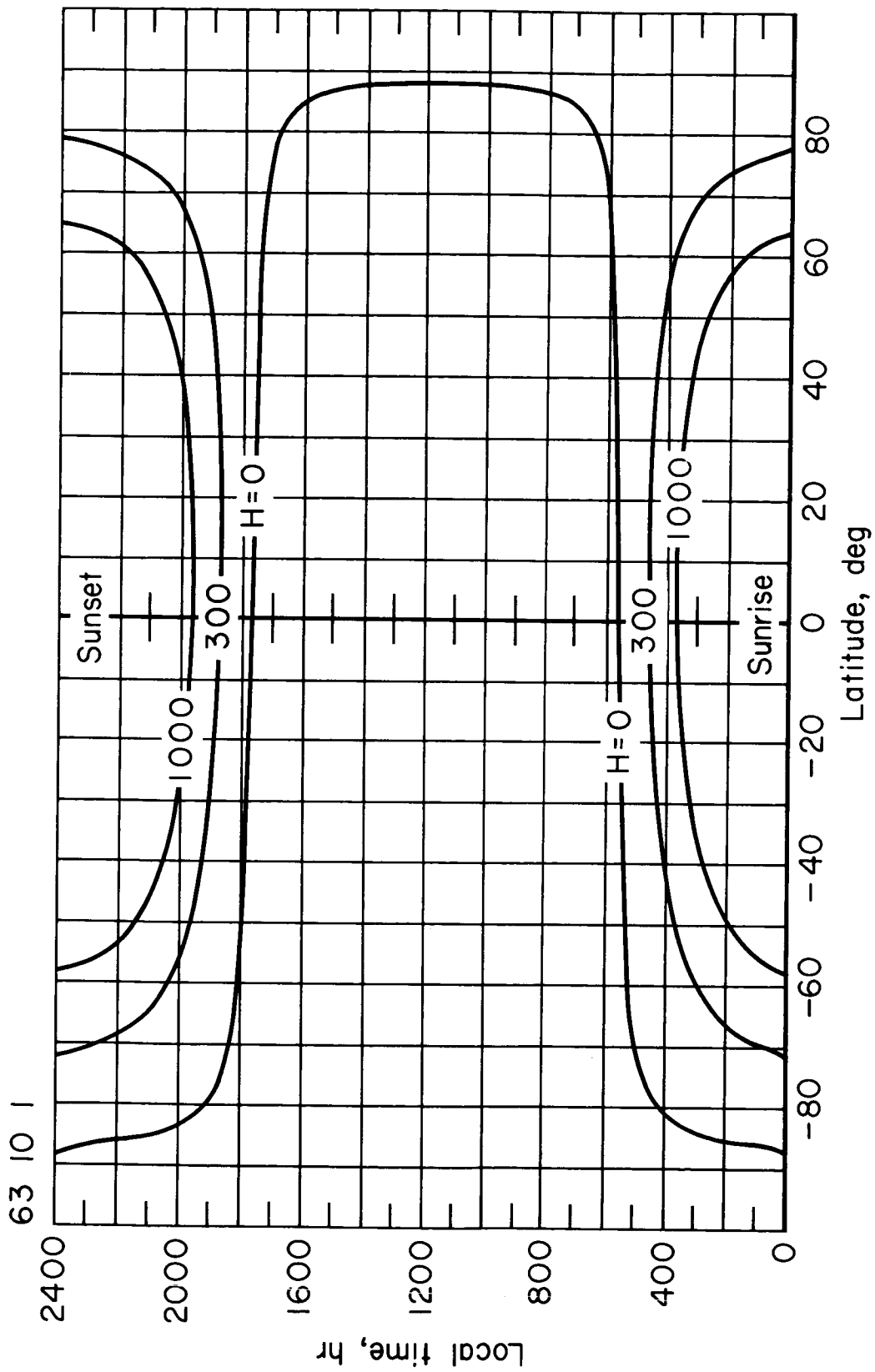


Figure 27.- Cartesian coordinate graphs of local sunrise and sunset times, October 1, 1963.

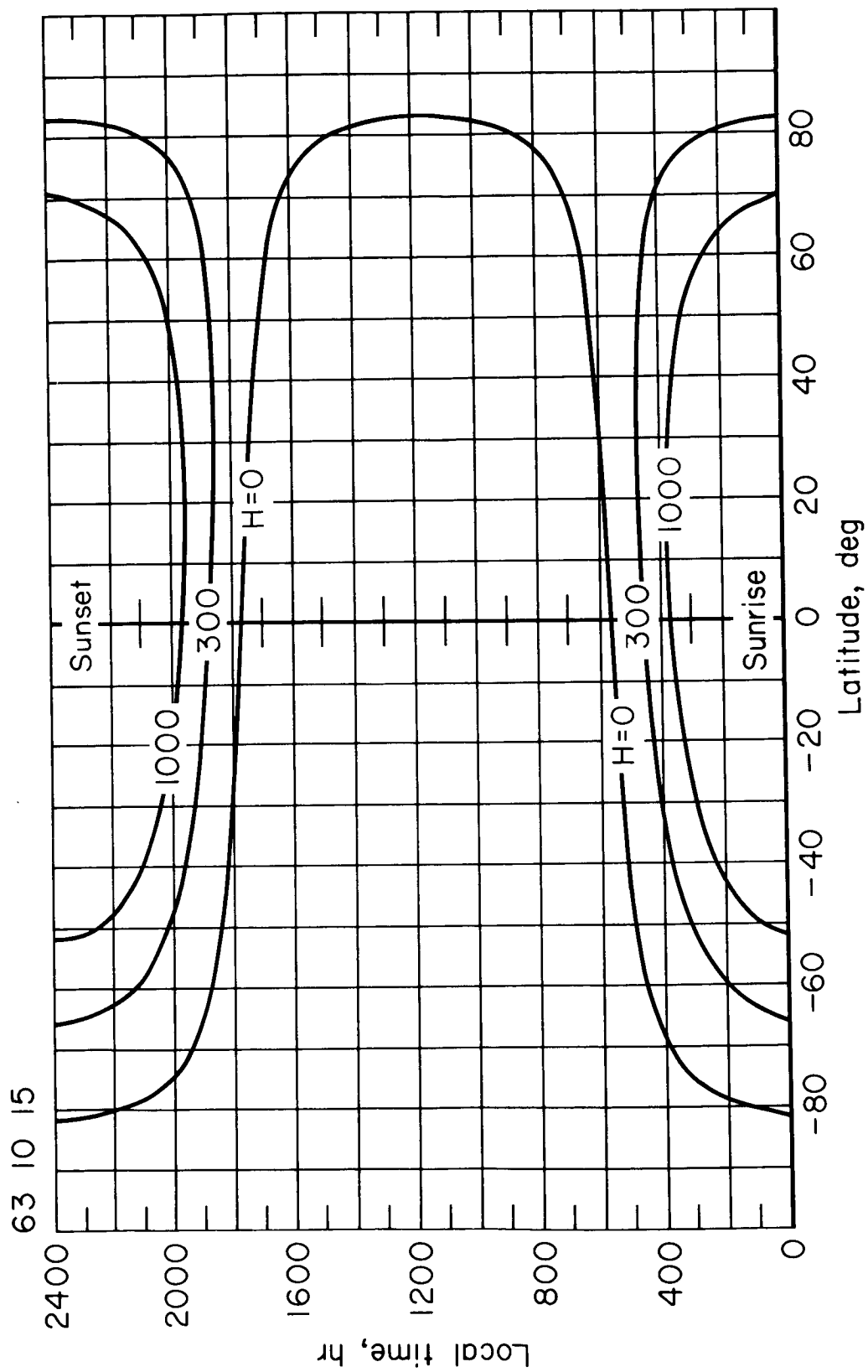


Figure 28.- Cartesian coordinate graphs of local sunrise and sunset times, October 15, 1963.

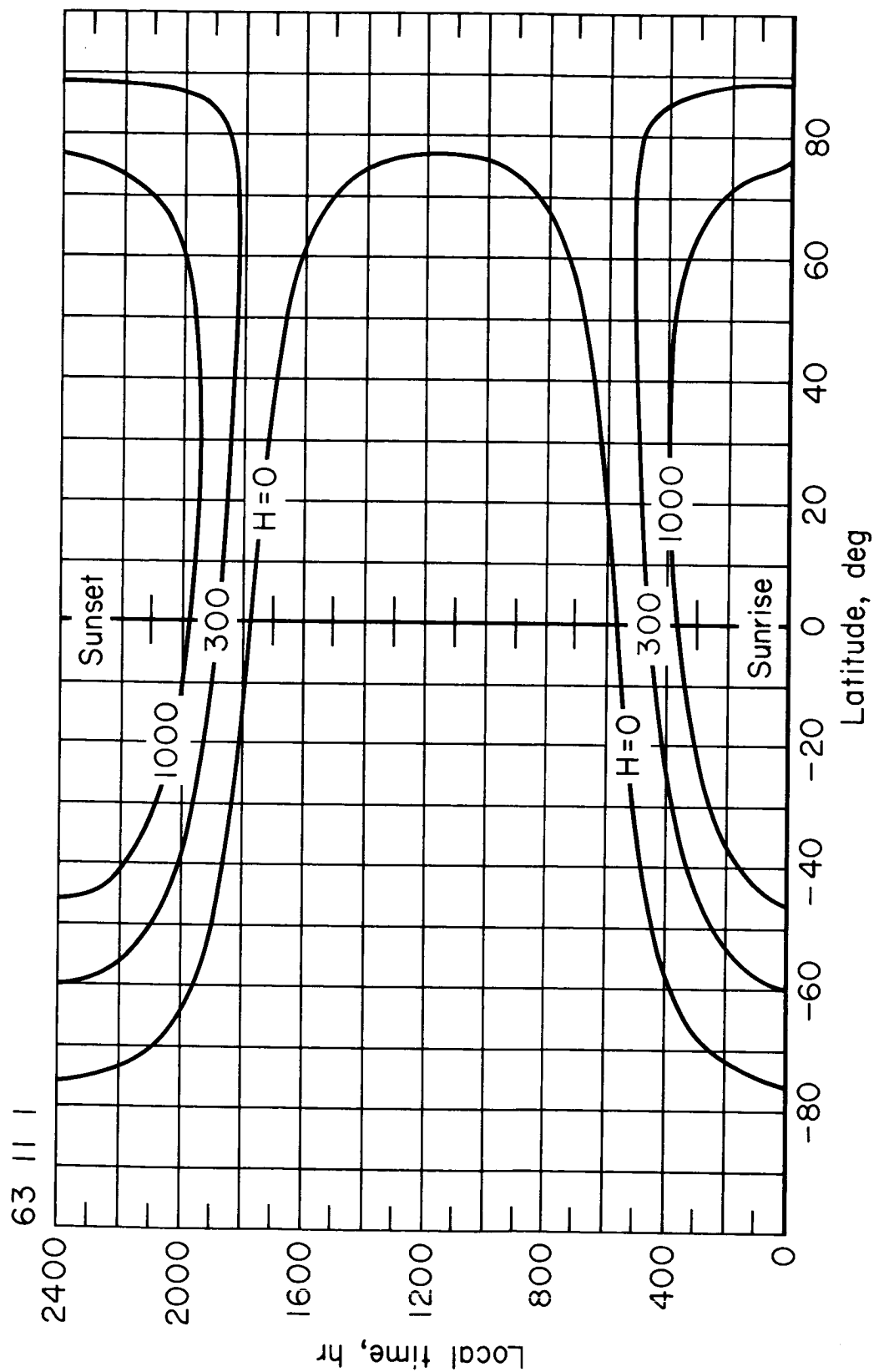


Figure 29.- Cartesian coordinate graphs of local sunrise and sunset times, November 1, 1963.

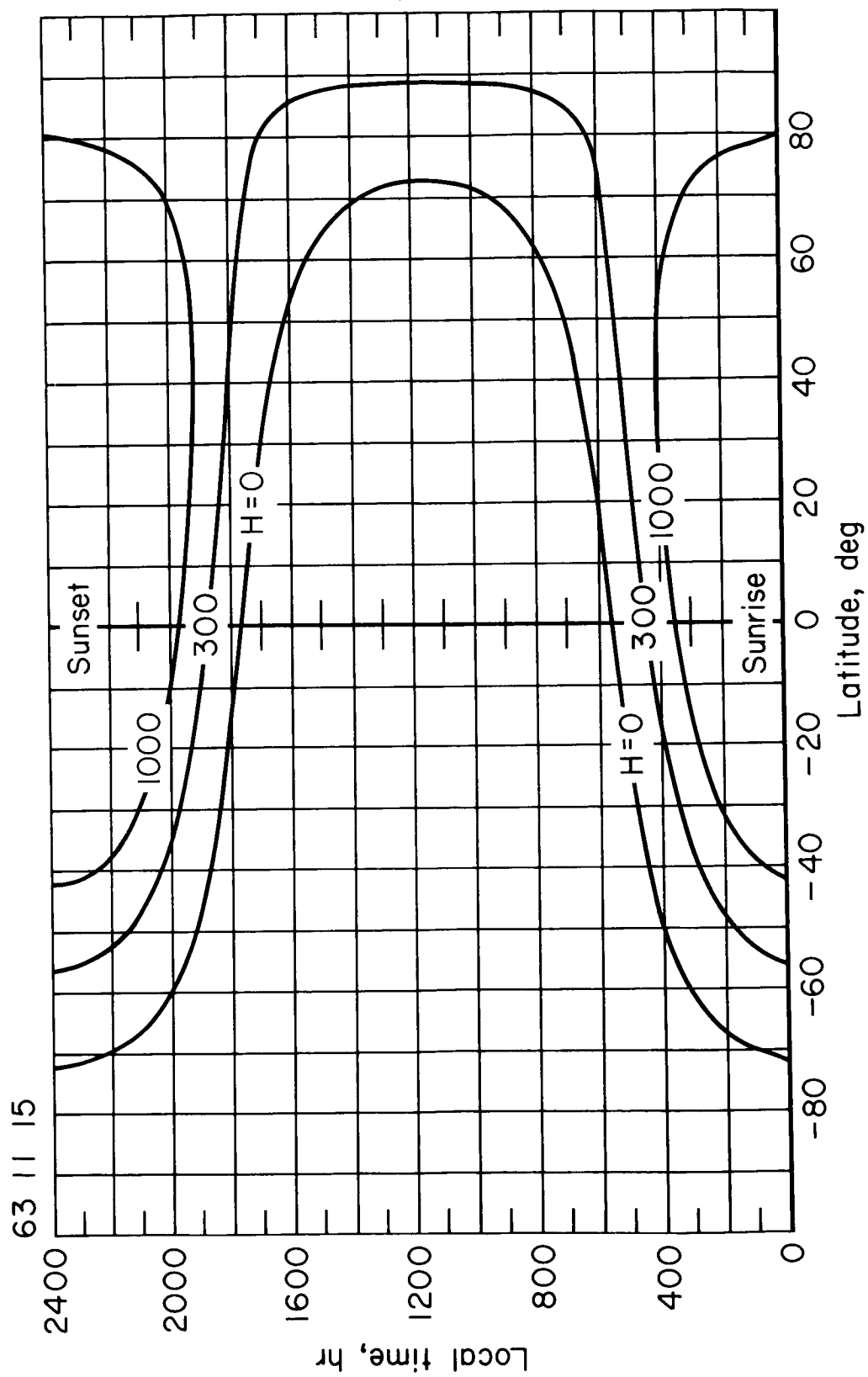


Figure 30.- Cartesian coordinate graphs of local sunrise and sunset times, November 15, 1963.

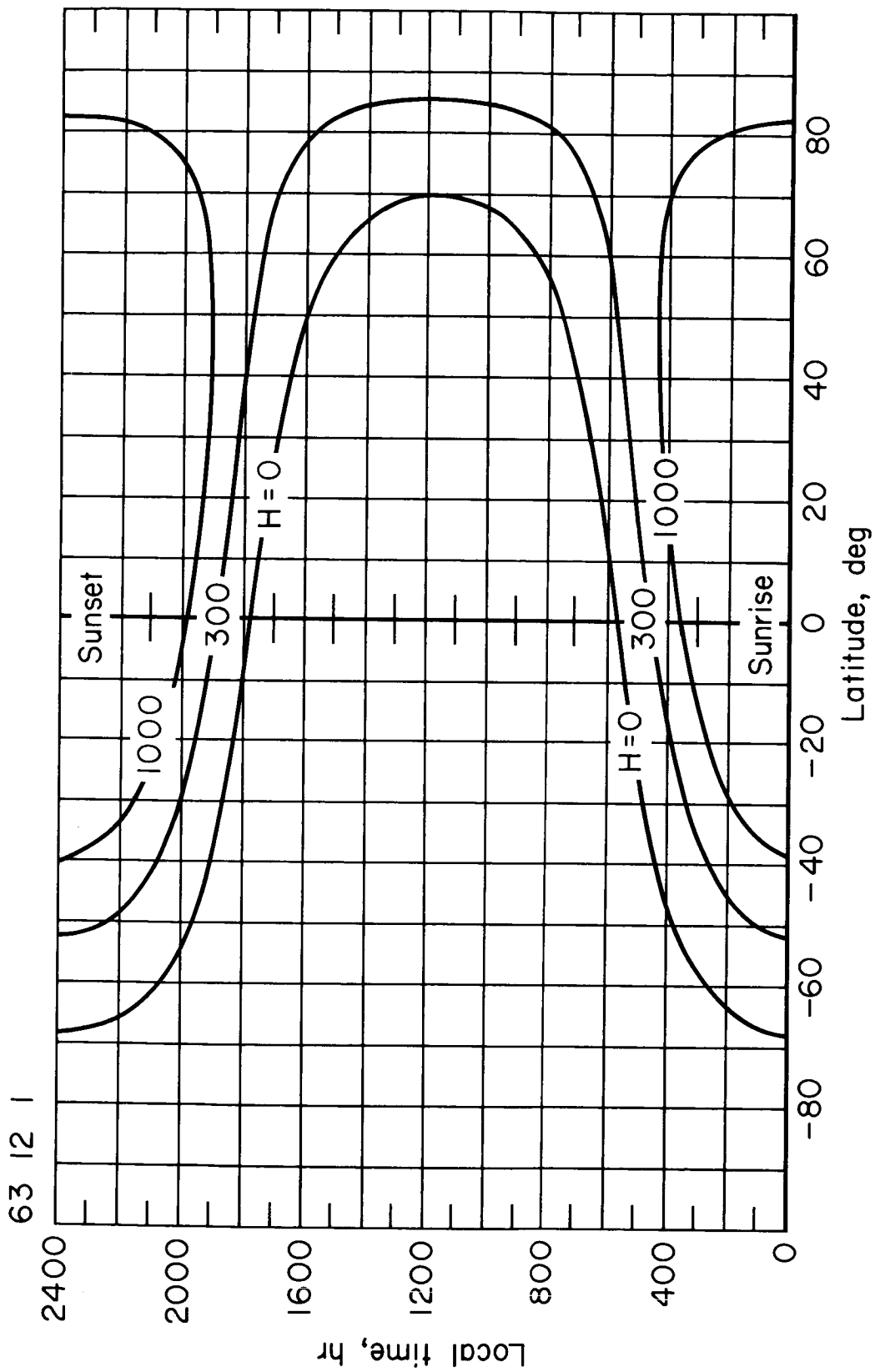


Figure 31.-- Cartesian coordinate graphs of local sunrise and sunset times, December 1, 1963.

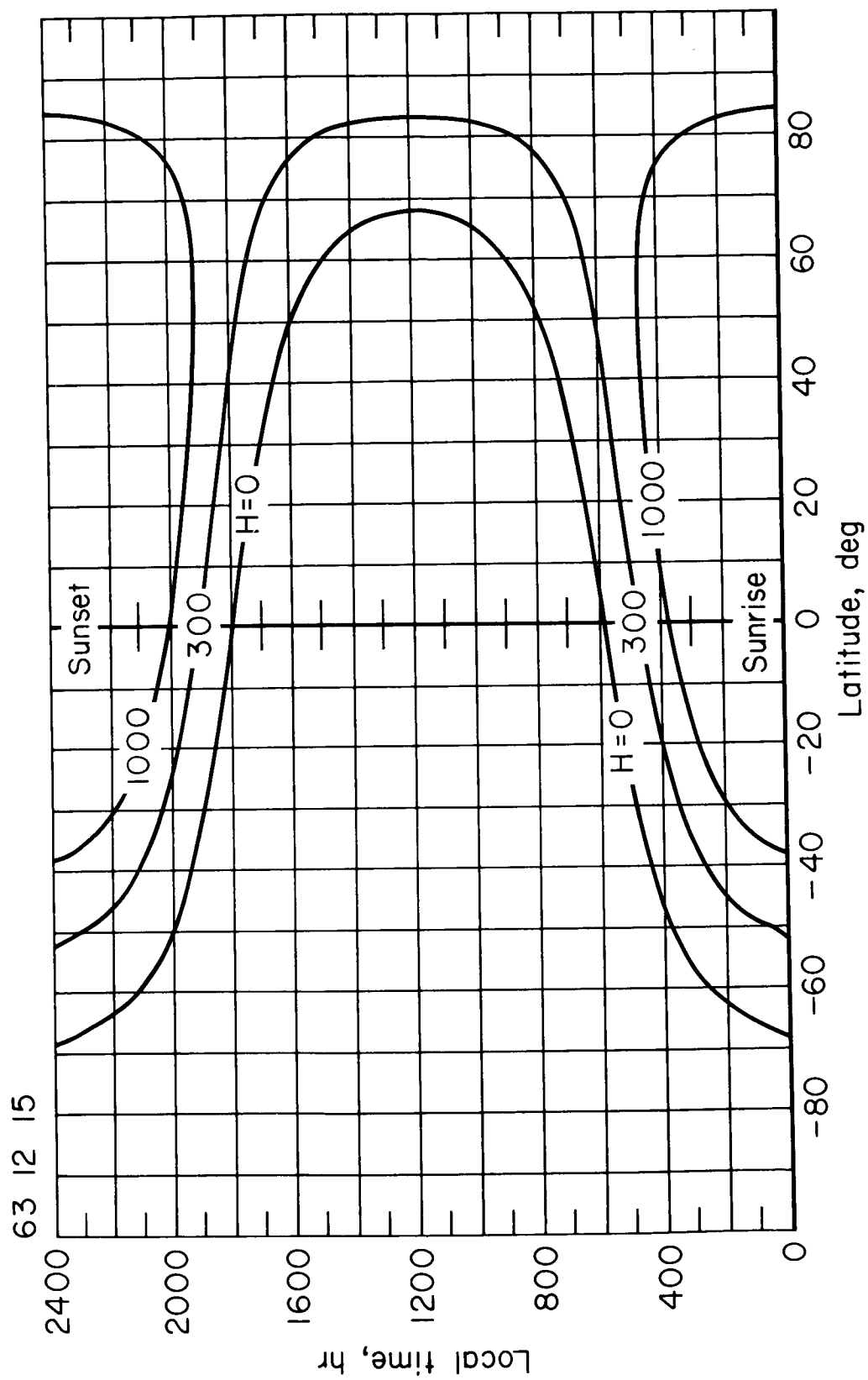


Figure 32.- Cartesian coordinate graphs of local sunrise and sunset times, December 15, 1963.

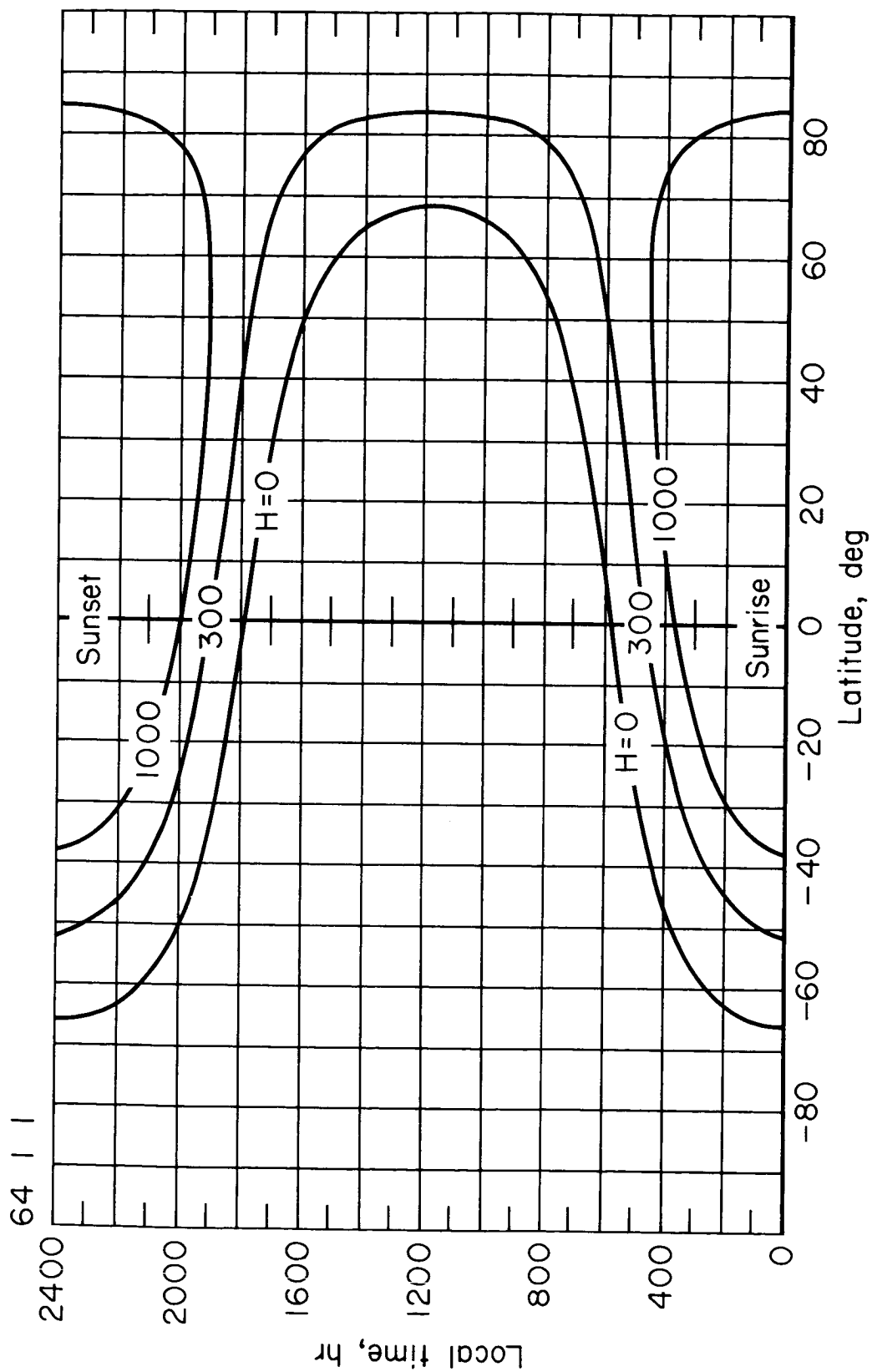


Figure 33.- Cartesian coordinate graphs of local sunrise and sunset times, January 1, 1964.

64 | 15

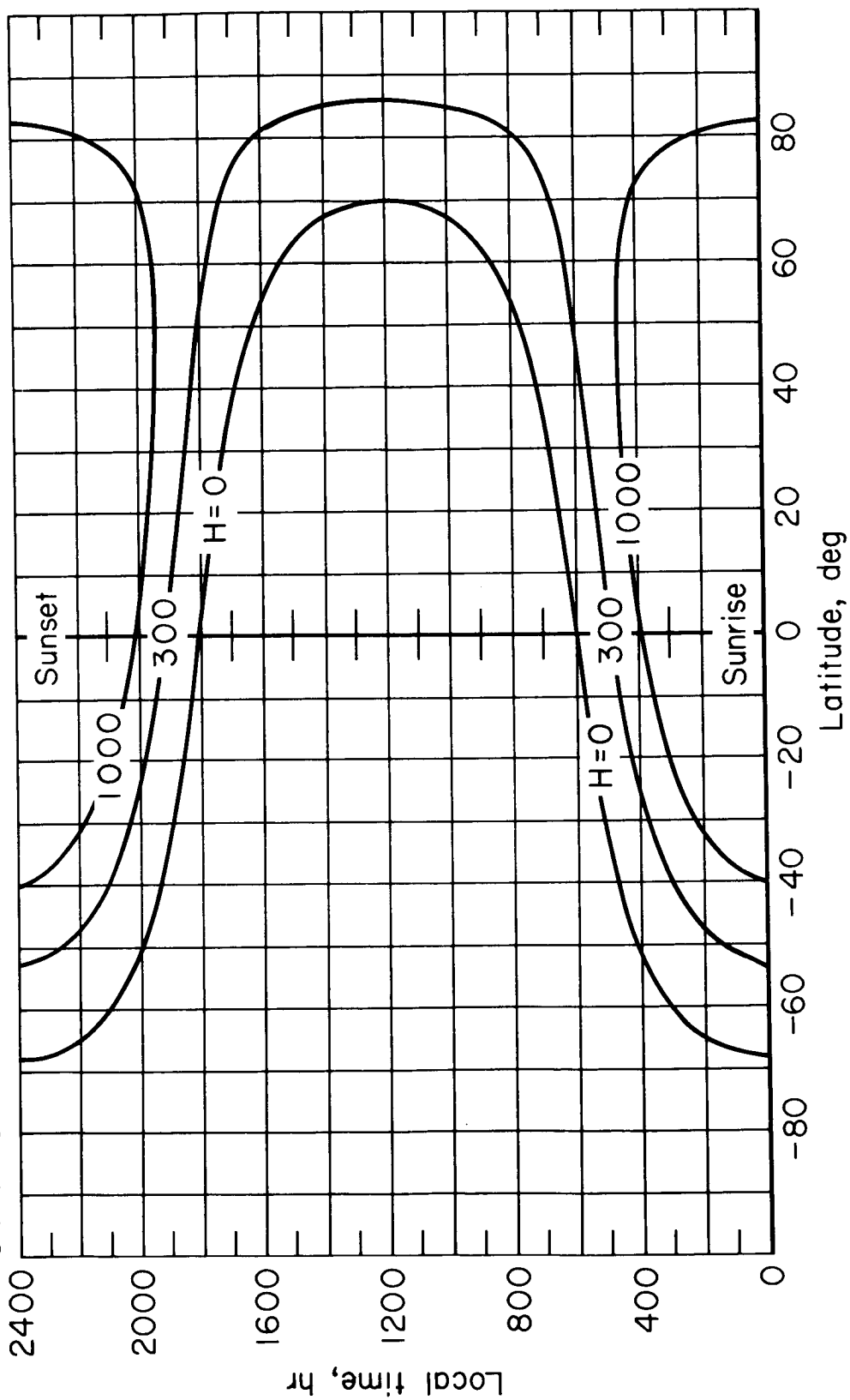


Figure 34.- Cartesian coordinate graphs of local sunrise and sunset times, January 15, 1964.

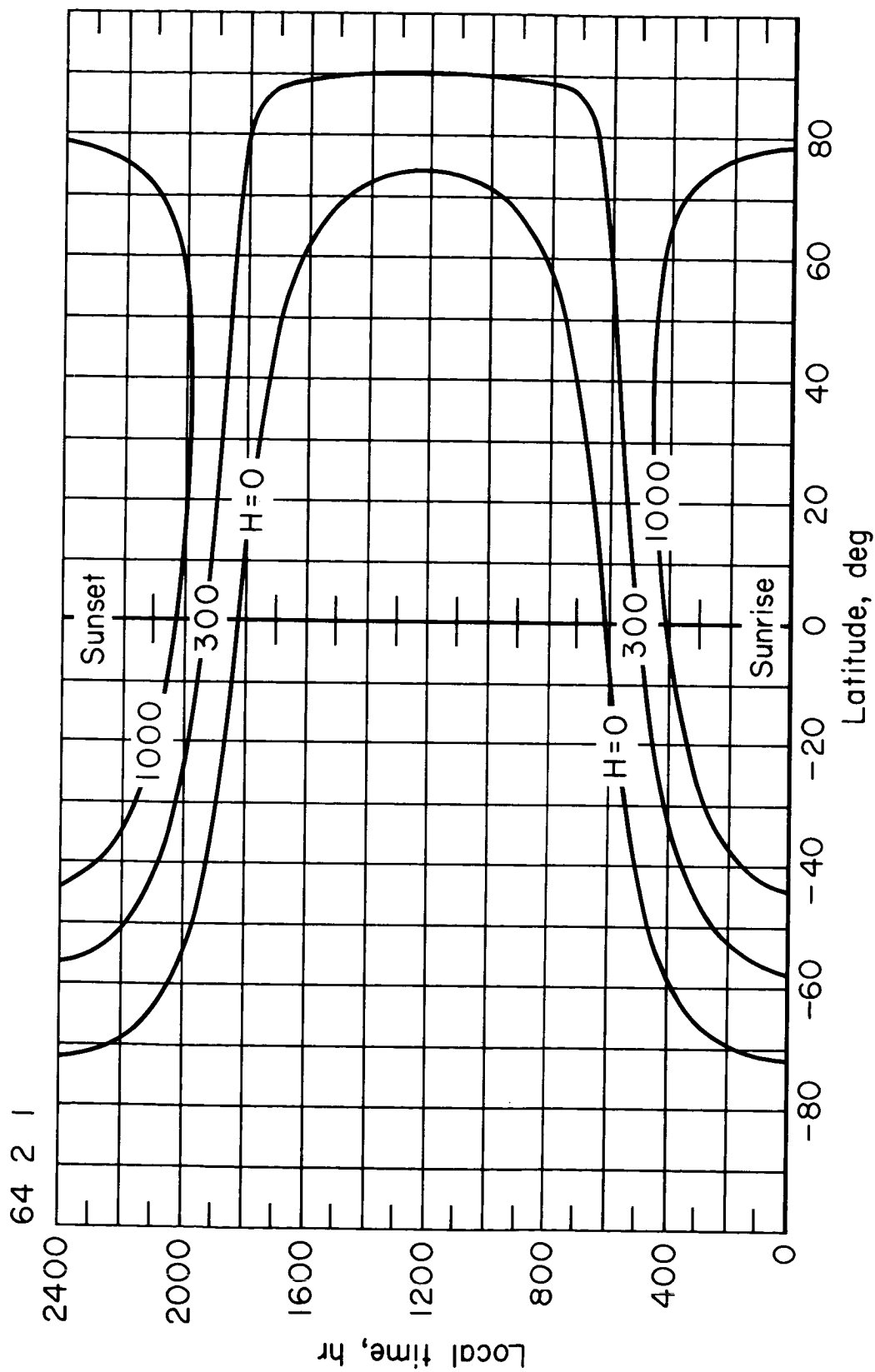


Figure 35.-- Cartesian coordinate graphs of local sunrise and sunset times, February 1, 1964.

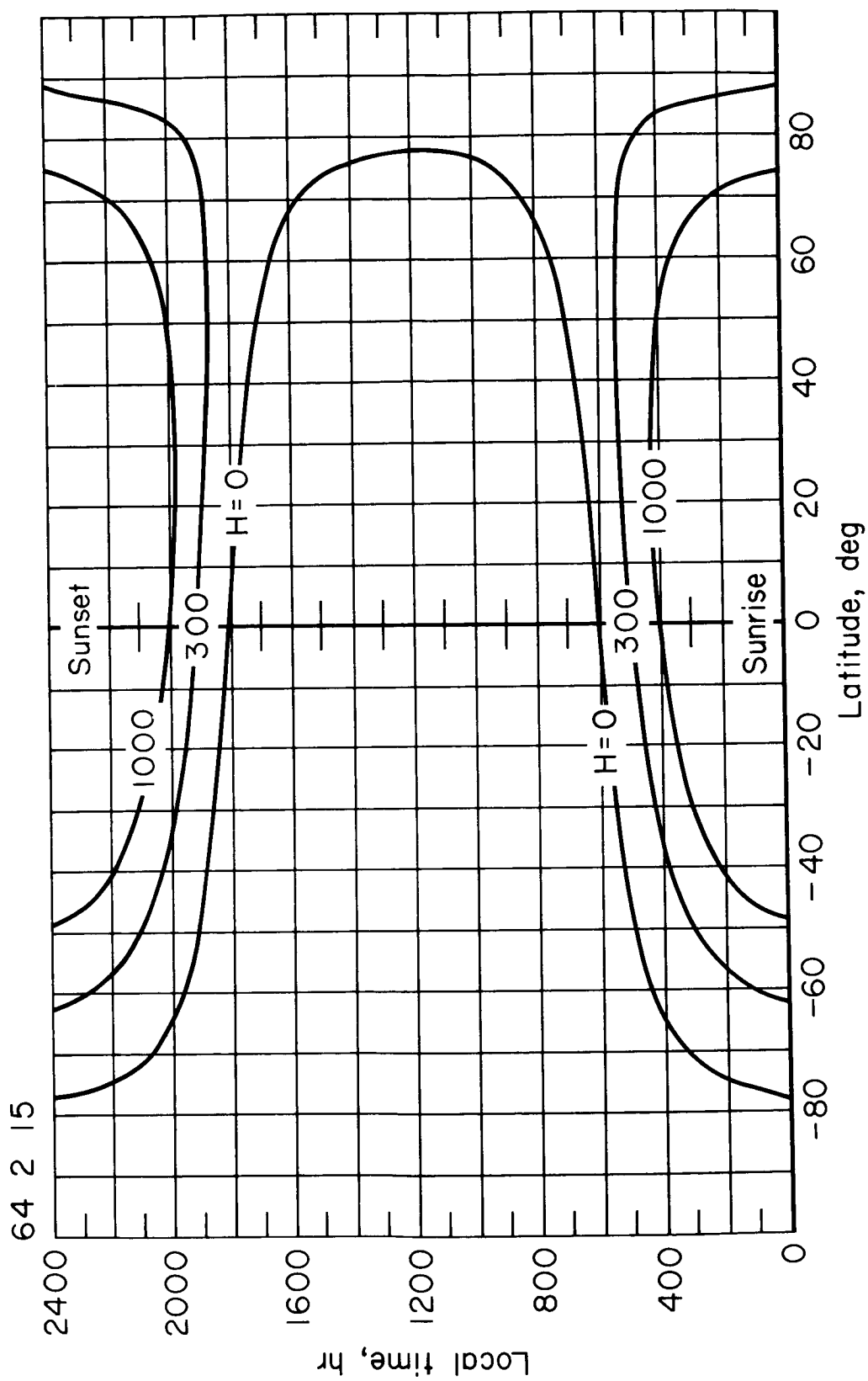


Figure 36.— Cartesian coordinate graphs of local sunrise and sunset times, February 15, 1964.

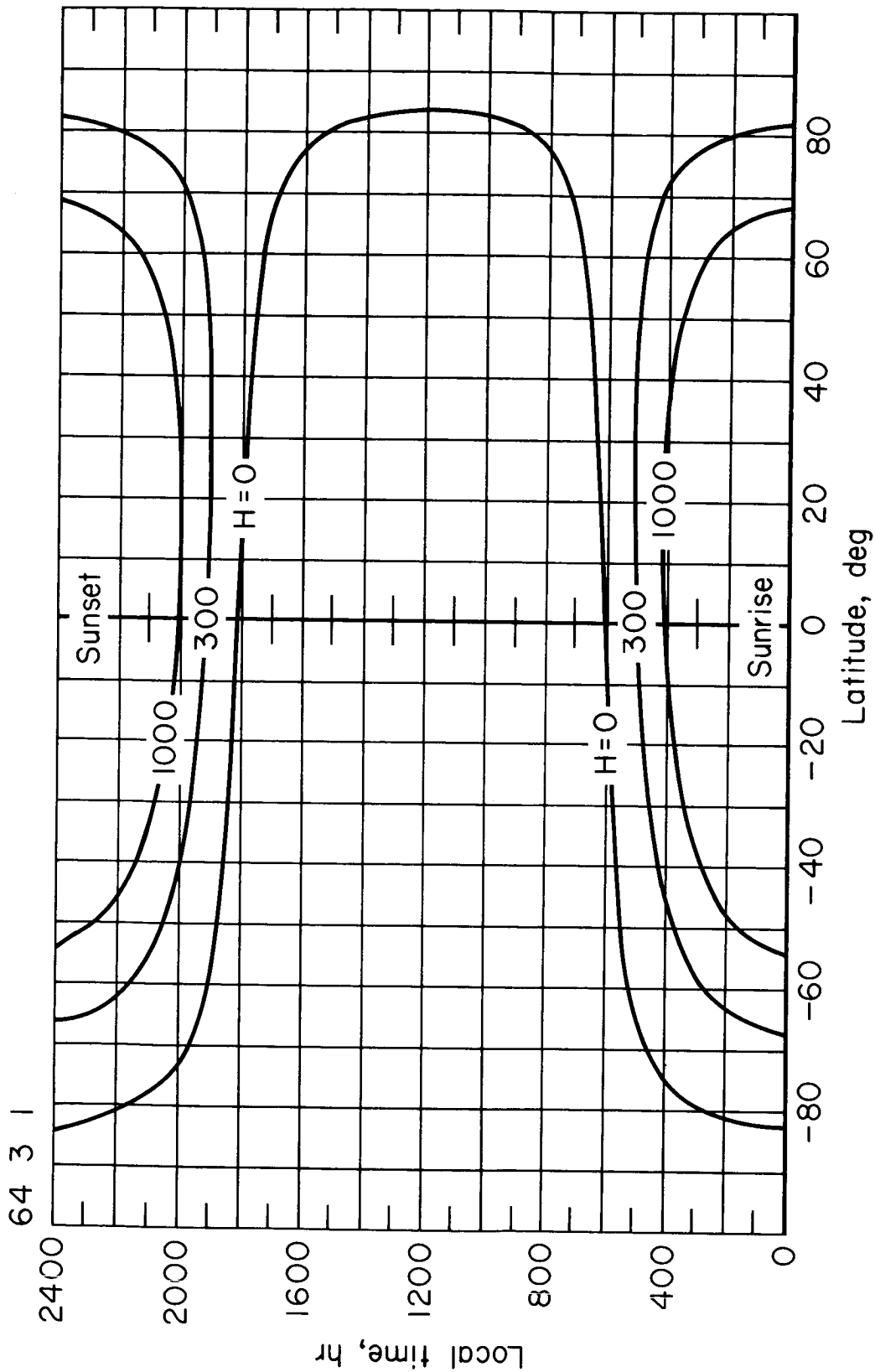


Figure 37.- Cartesian coordinate graphs of local sunrise and sunset times, March 1, 1964.

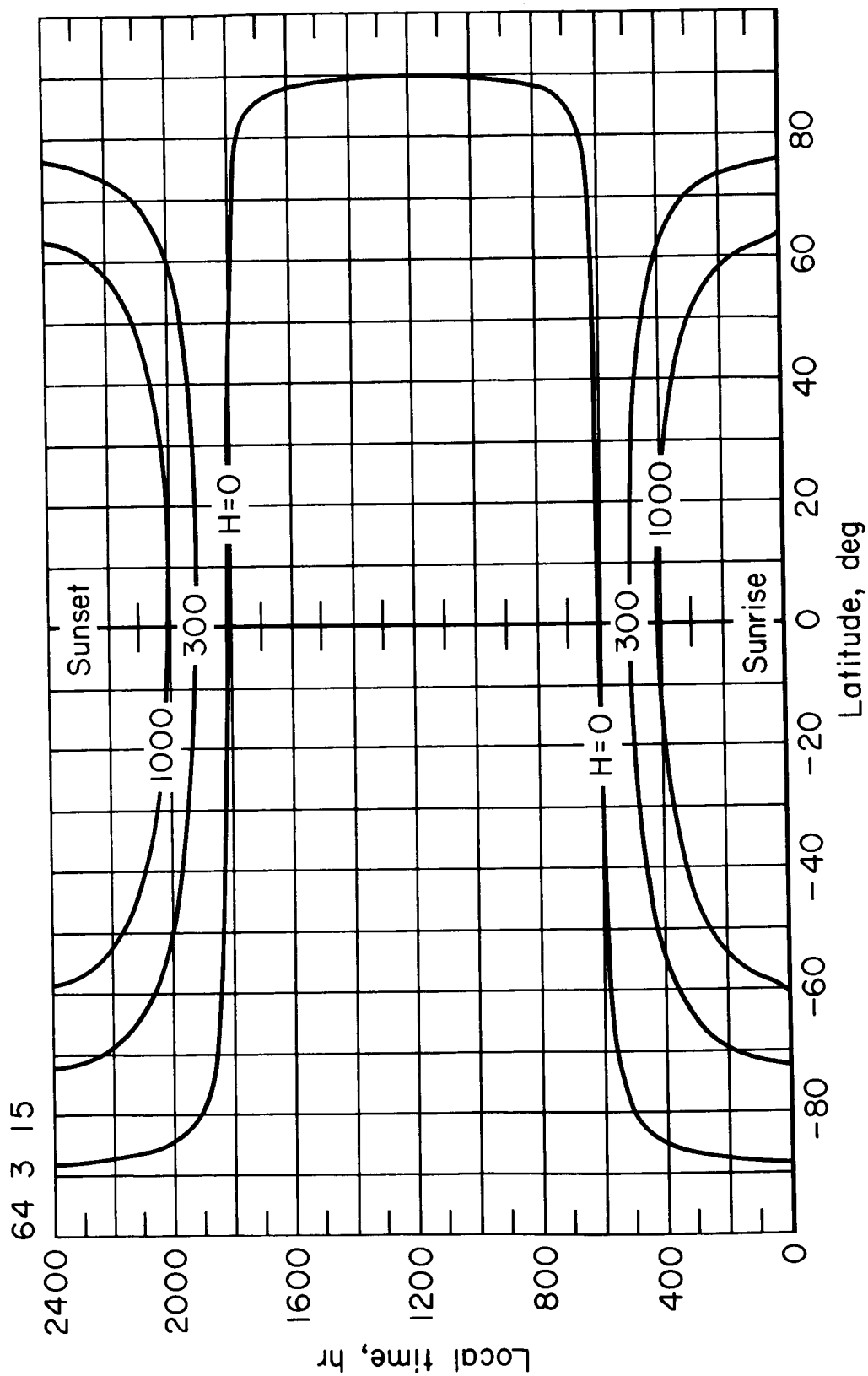


Figure 38.— Cartesian coordinate graphs of local sunrise and sunset times, March 15, 1964.

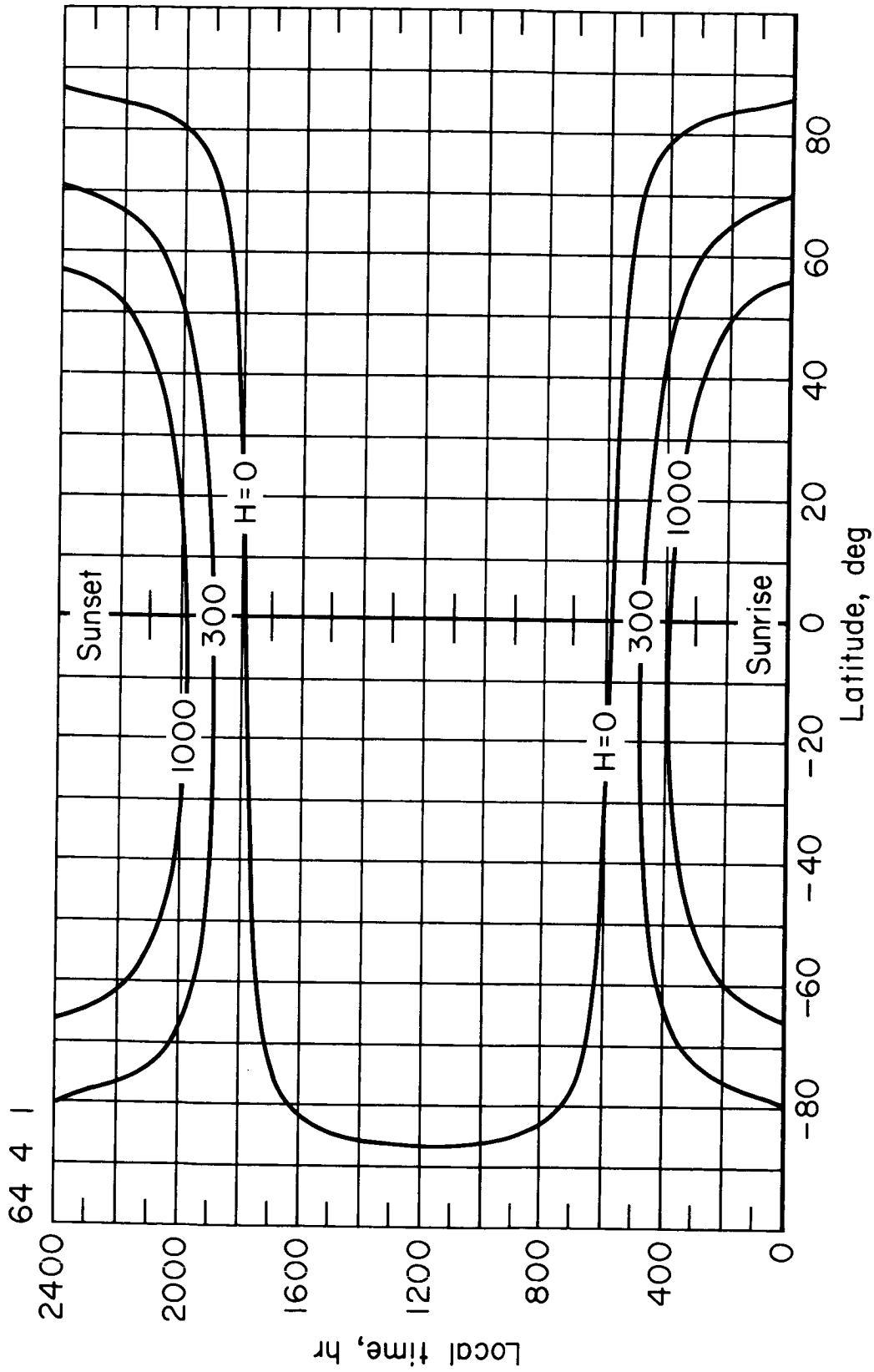


Figure 39.-- Cartesian coordinate graphs of local sunrise and sunset times, April 1, 1964.

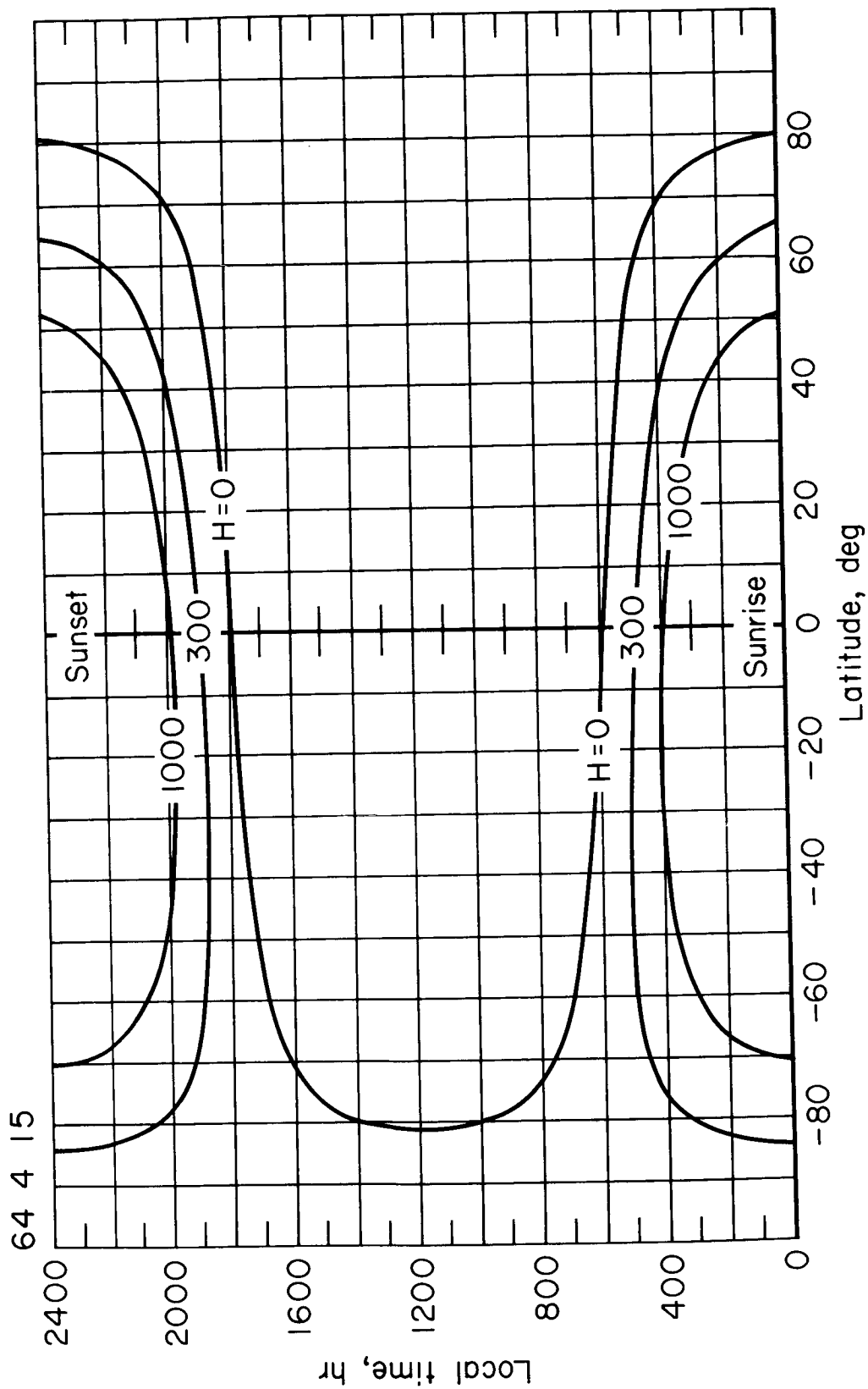


Figure 40.- Cartesian coordinate graphs of local sunrise and sunset times, April 15, 1964.

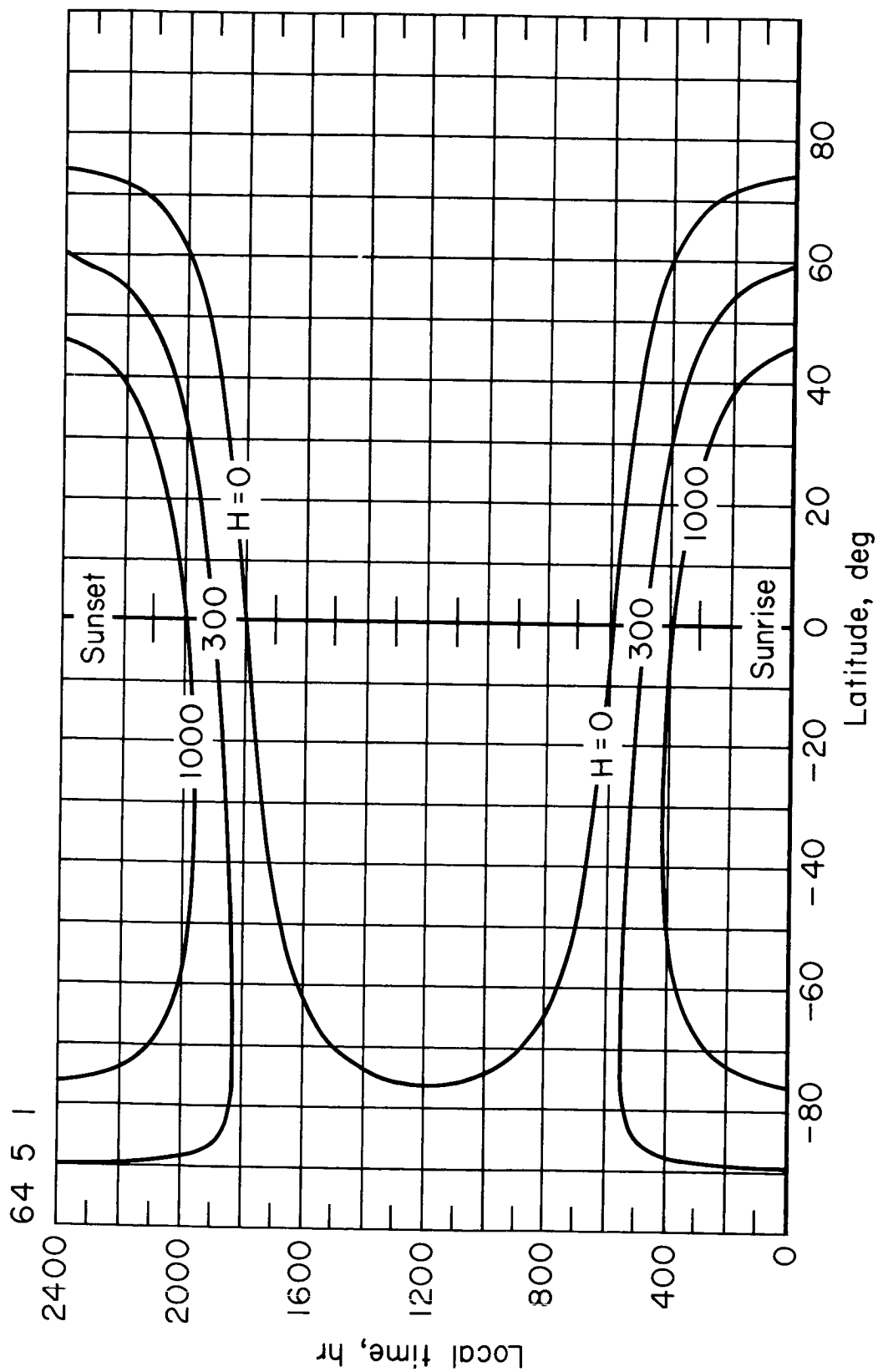


Figure 41.-- Cartesian coordinate graphs of local sunrise and sunset times, May 1, 1964.

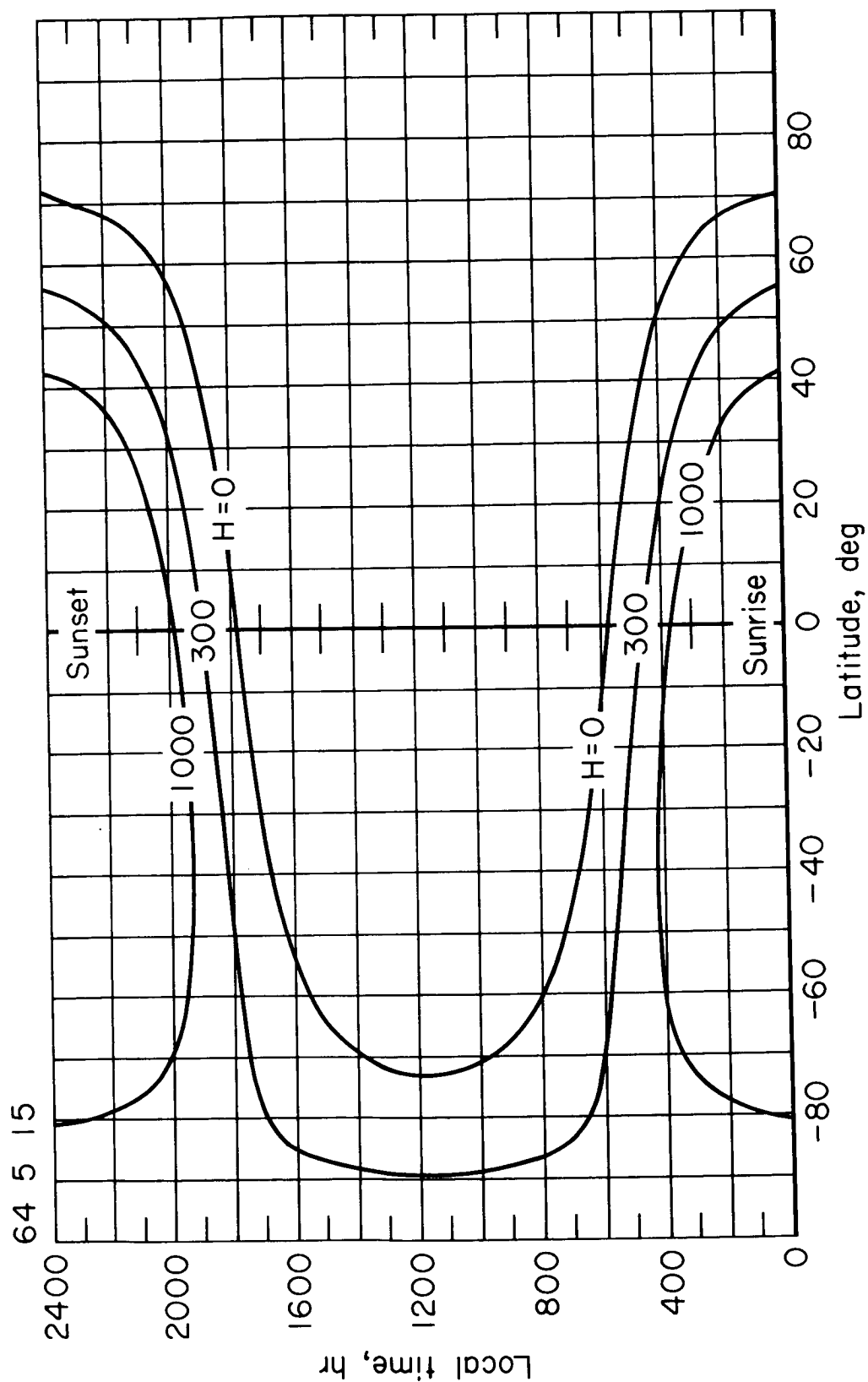


Figure 42.- Cartesian coordinate graphs of local sunrise and sunset times, May 15, 1964.

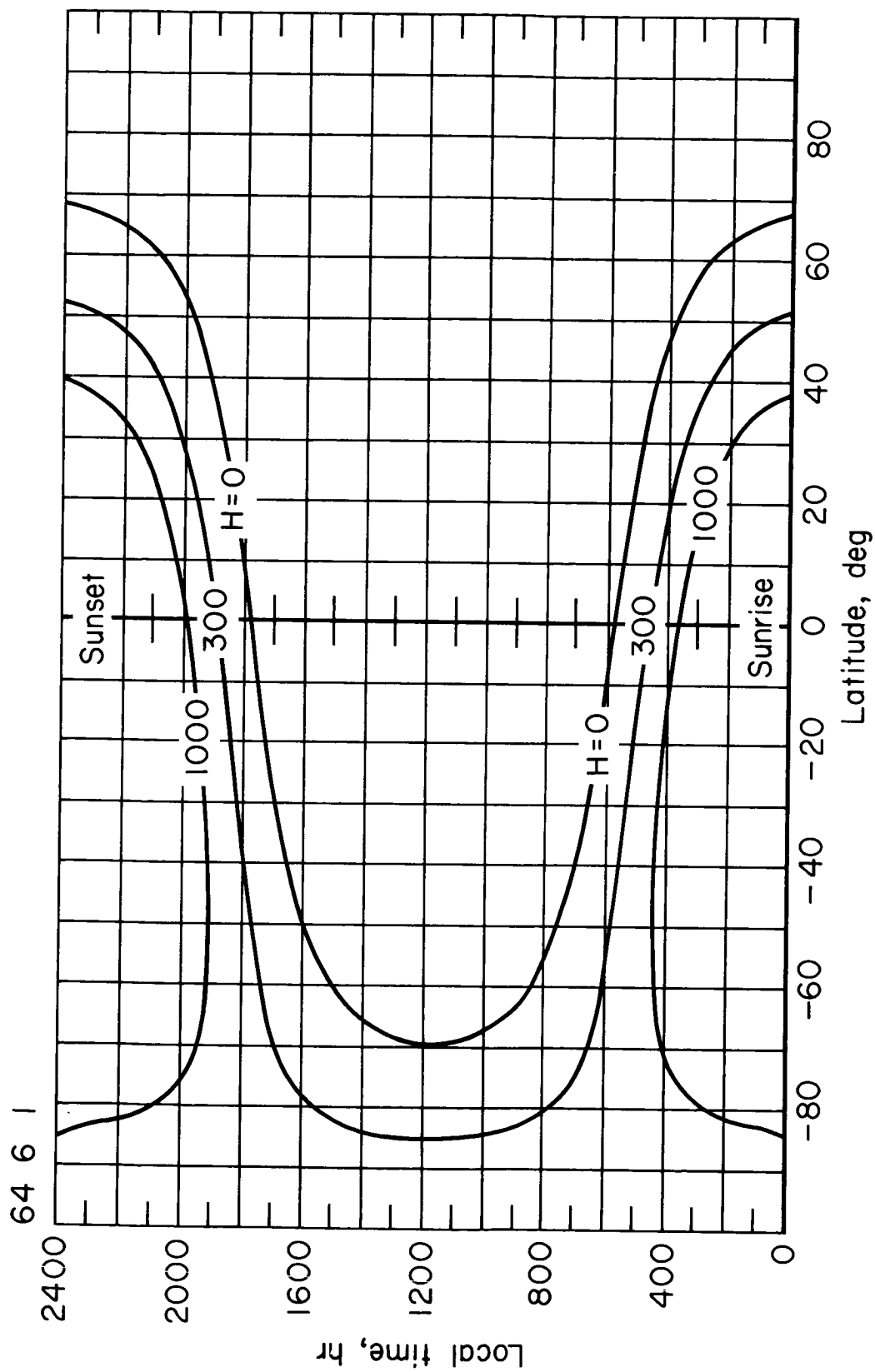


Figure 43.- Cartesian coordinate graphs of local sunrise and sunset times, June 1, 1964.

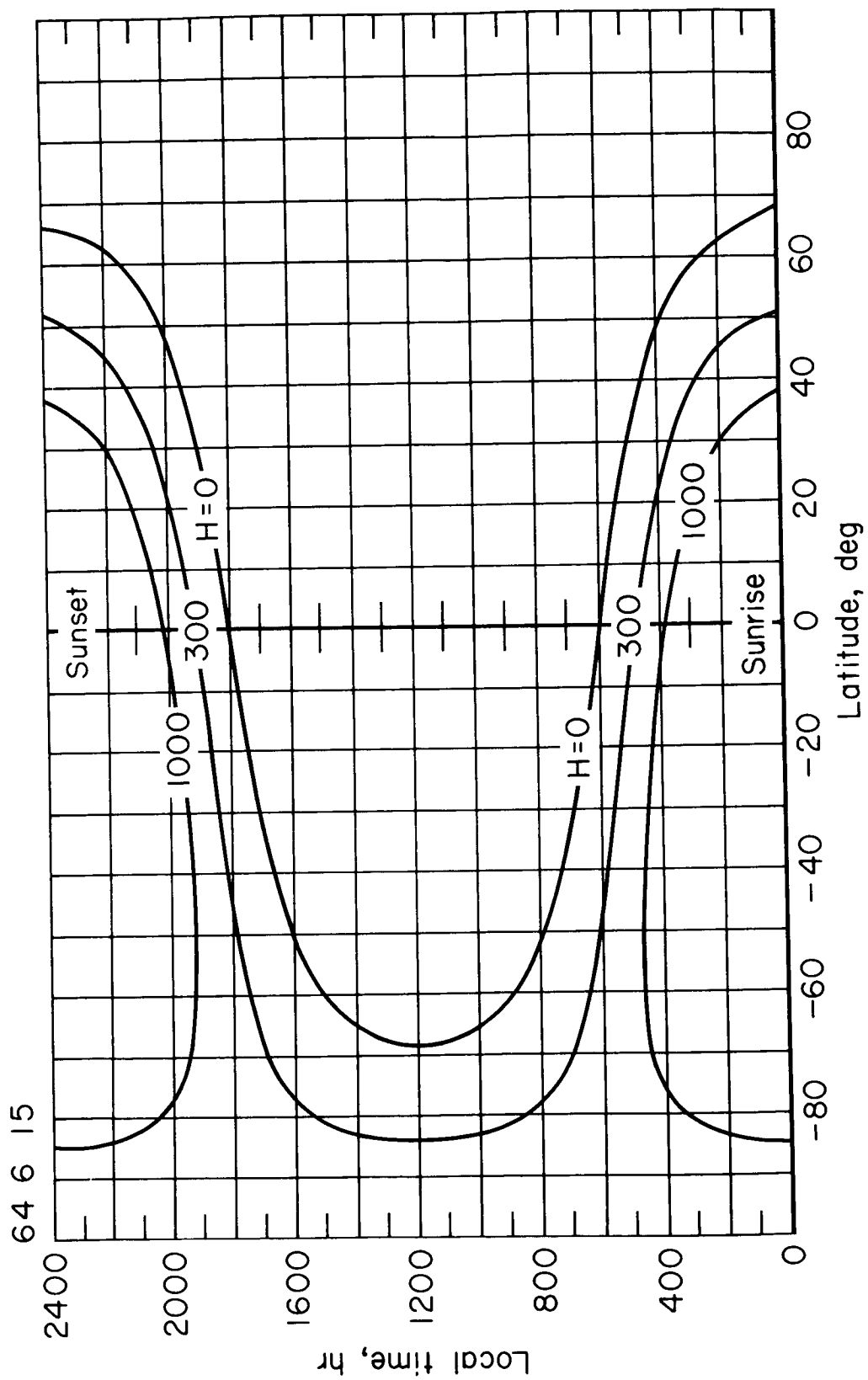


Figure 44.- Cartesian coordinate graphs of local sunrise and sunset times, June 15, 1964.

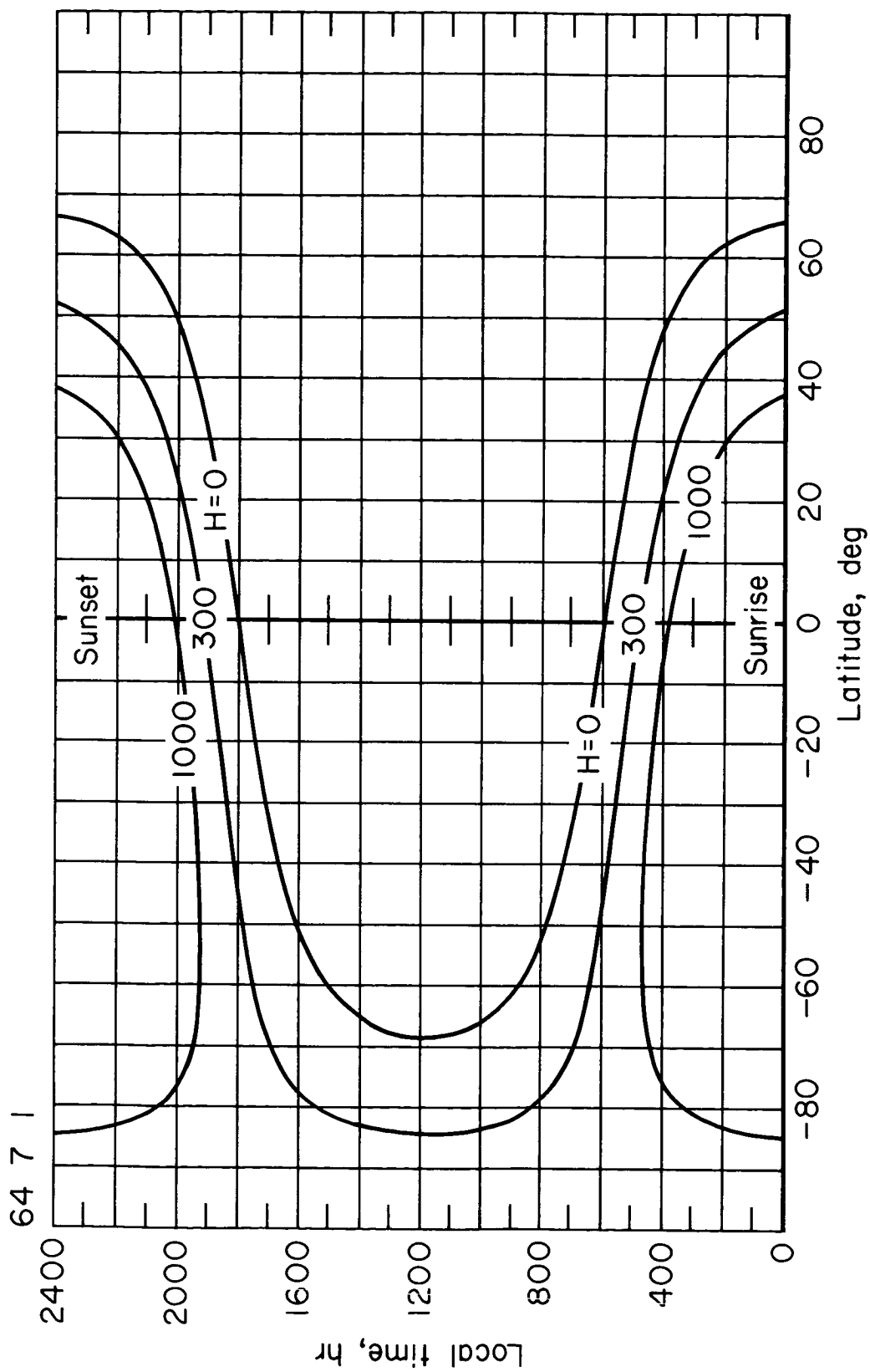


Figure 45.-- Cartesian coordinate graphs of local sunrise and sunset times, July 1, 1964.

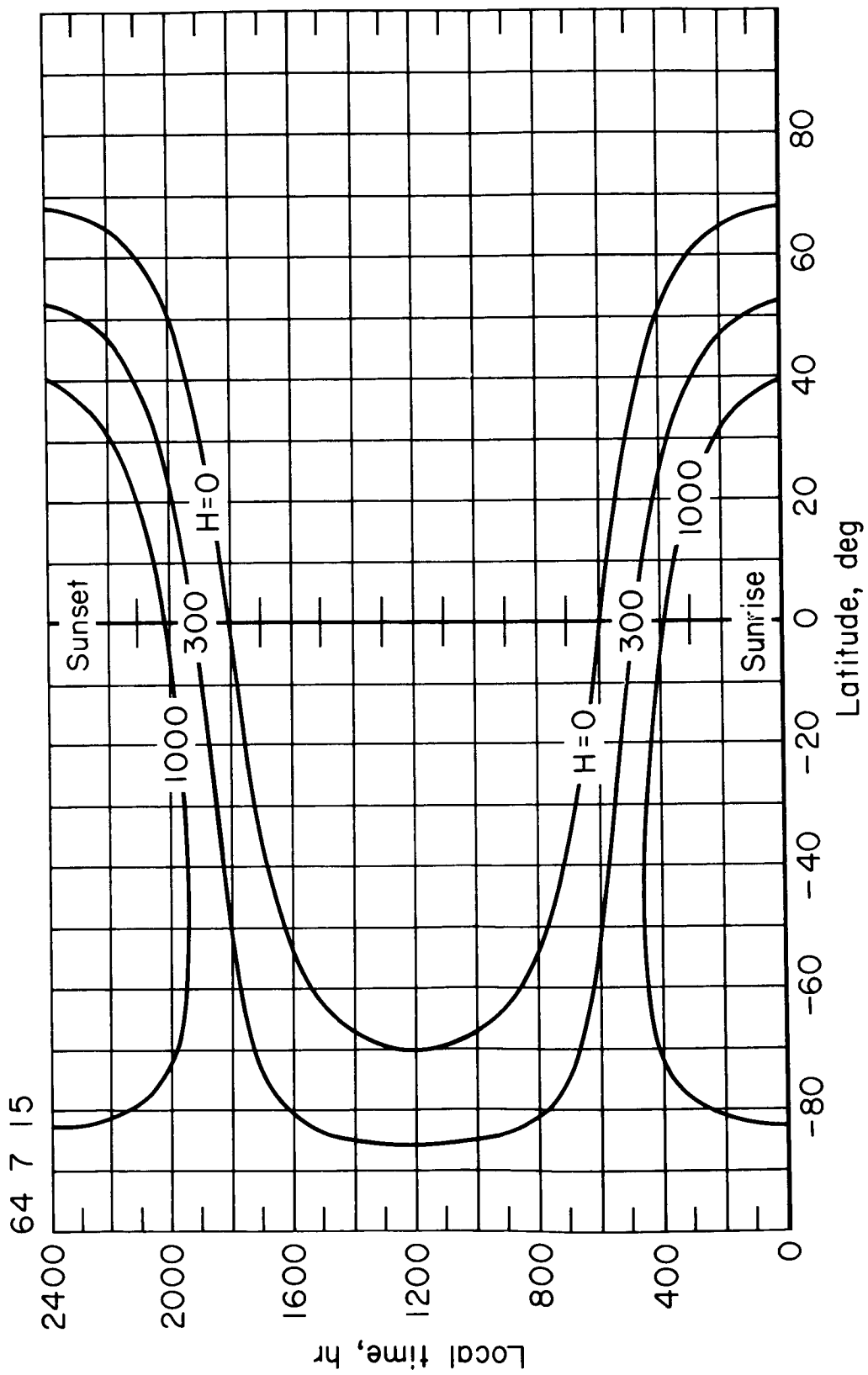


Figure 46.- Cartesian coordinate graphs of local sunrise and sunset times, July 15, 1964.

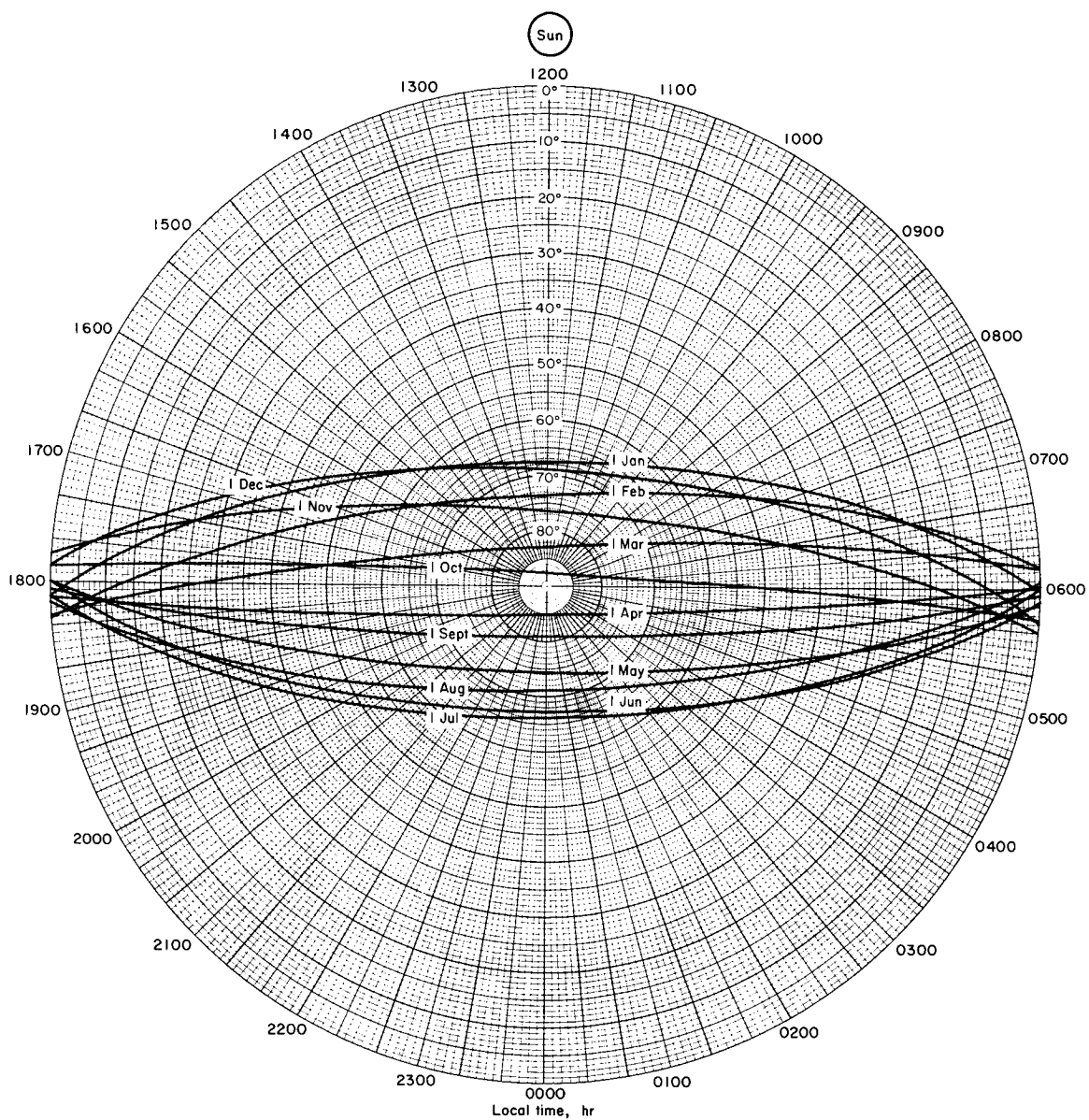


Figure 47.- Sunrise-sunset lines, height = 0 km, north polar region.

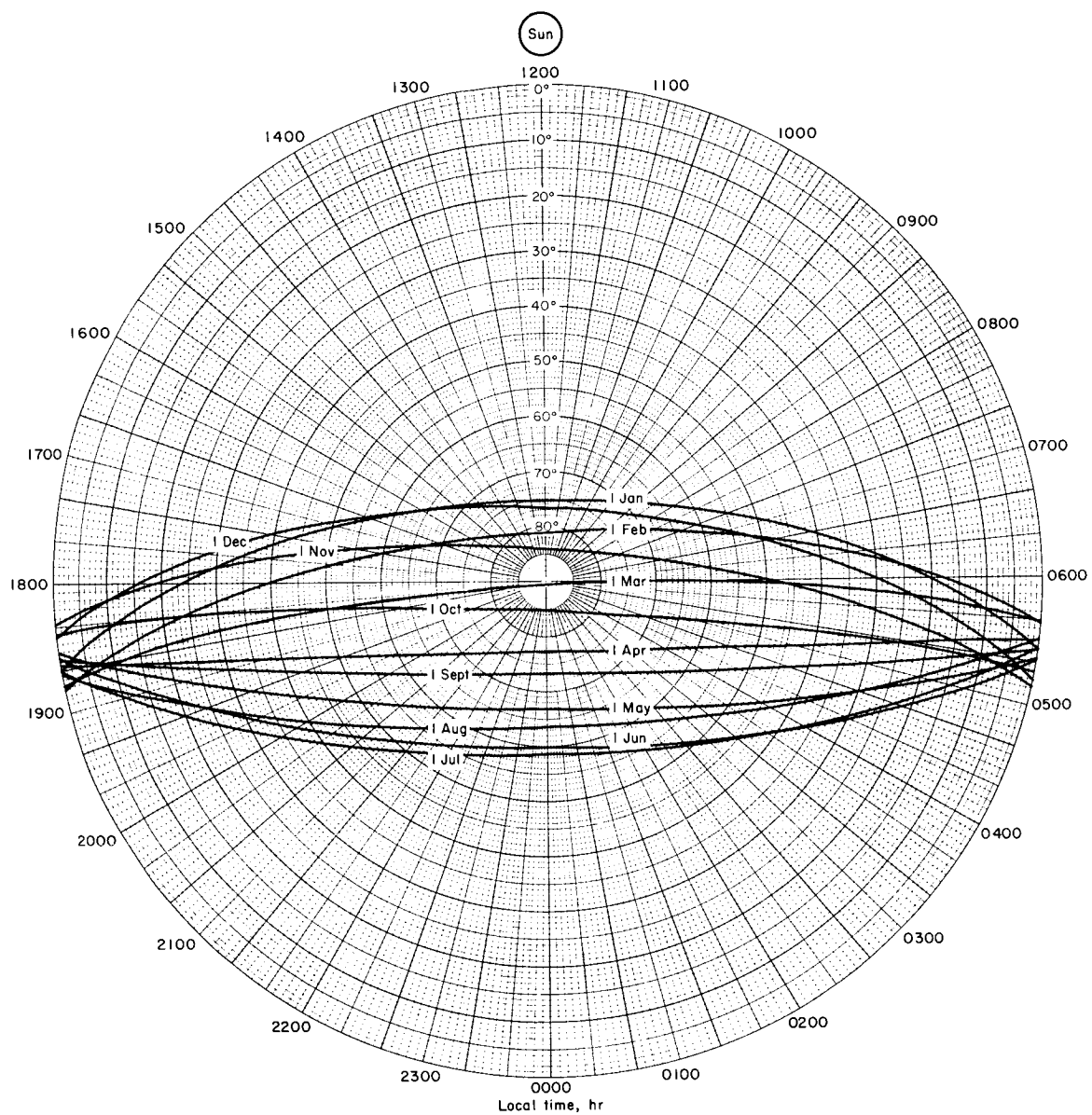


Figure 48.- Sunrise-sunset lines, height = 100 km, north polar region.

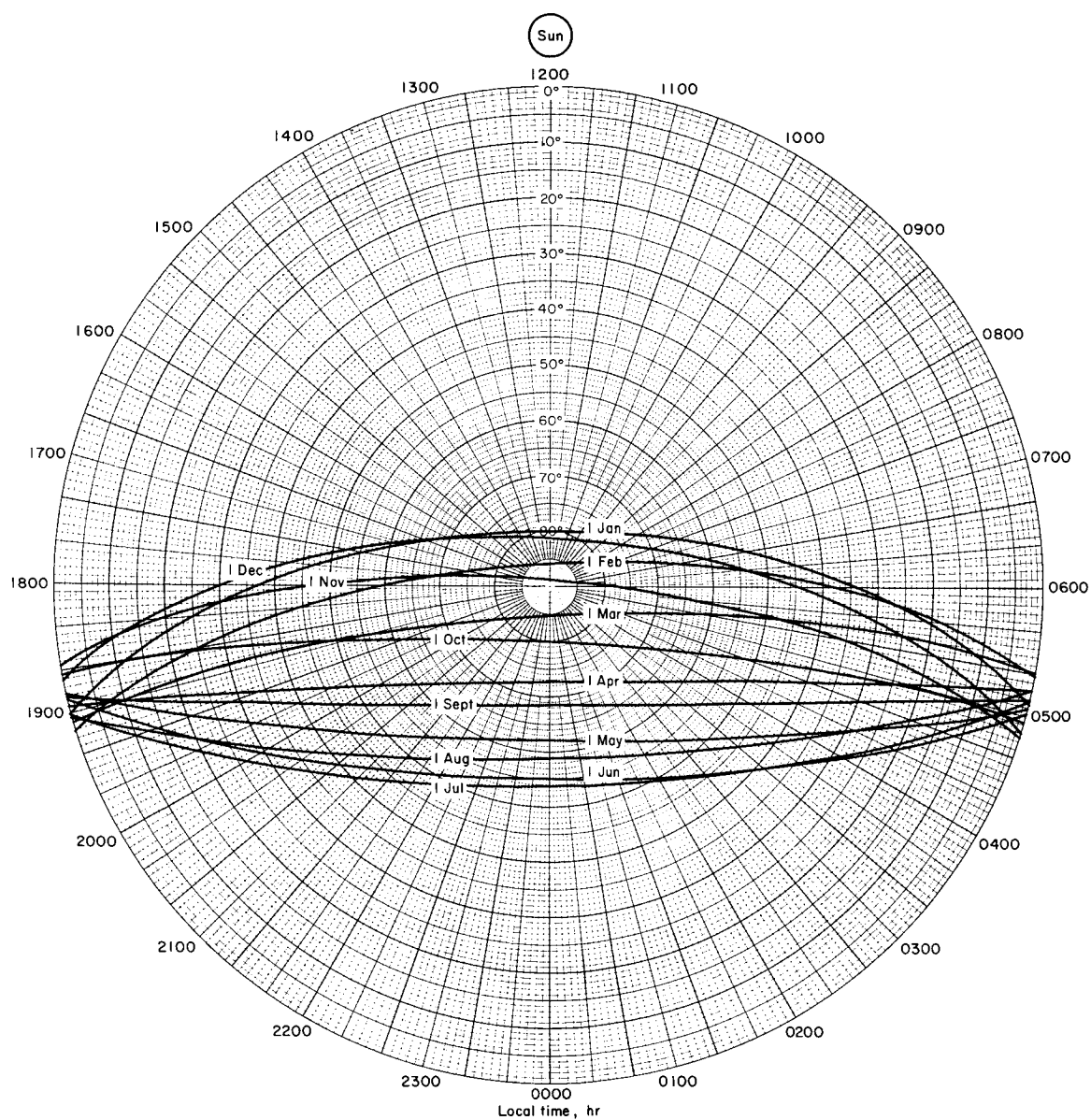


Figure 49.- Sunrise-sunset lines, height = 200 km, north polar region.

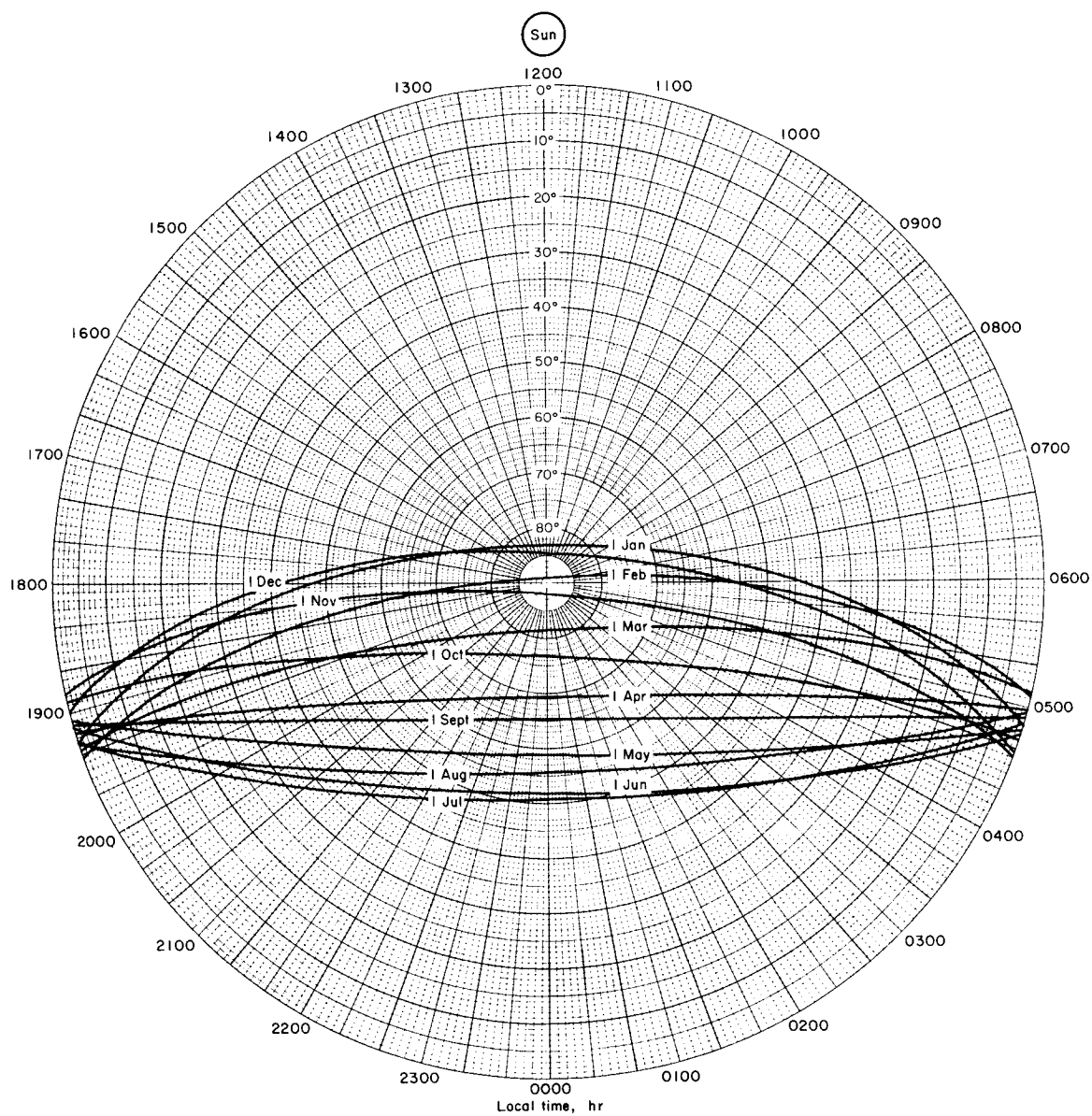


Figure 50.- Sunrise-sunset lines, height = 300 km, north polar projection.

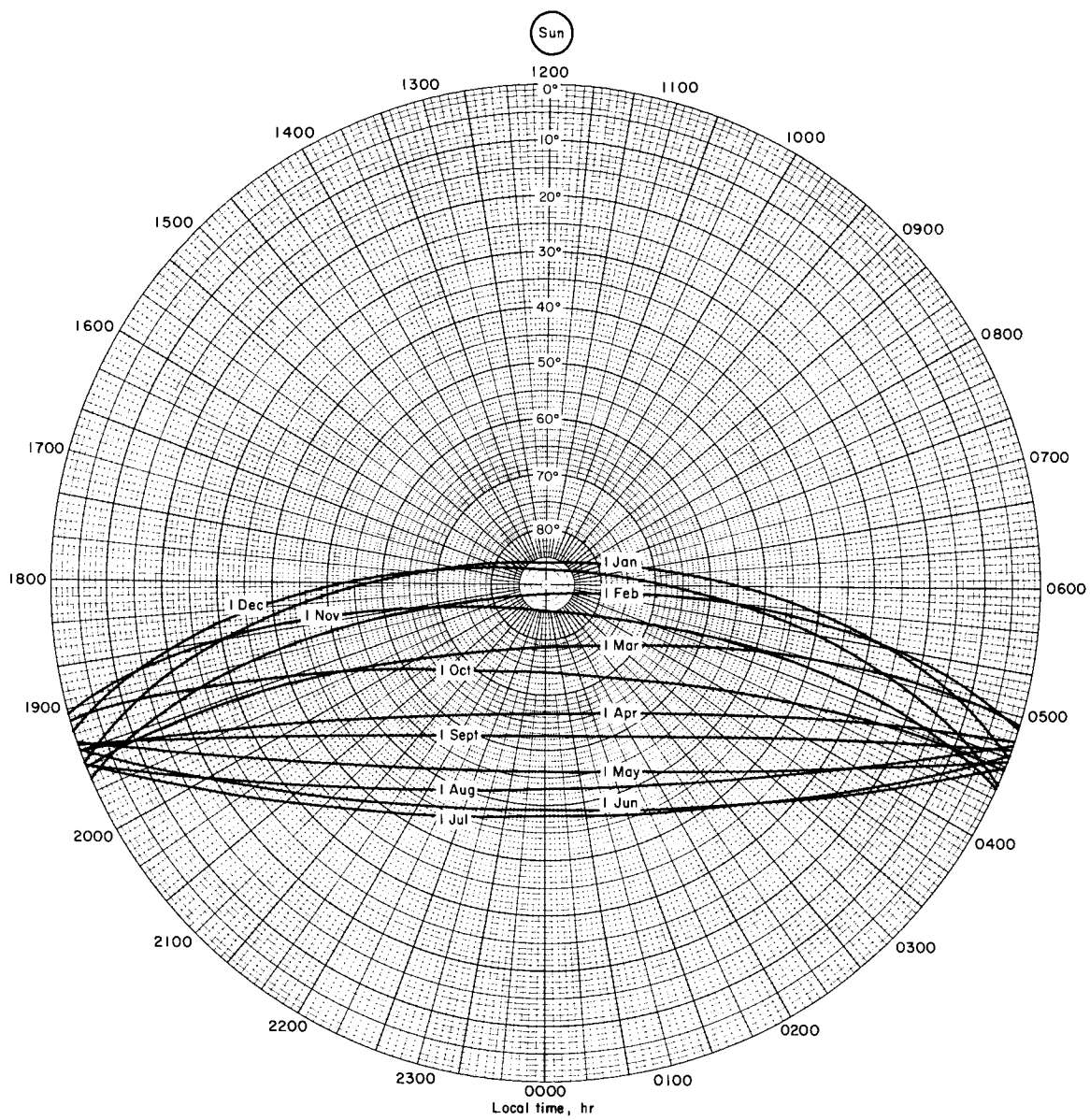


Figure 51.- Sunrise-sunset lines, height = 400 km, north polar region.

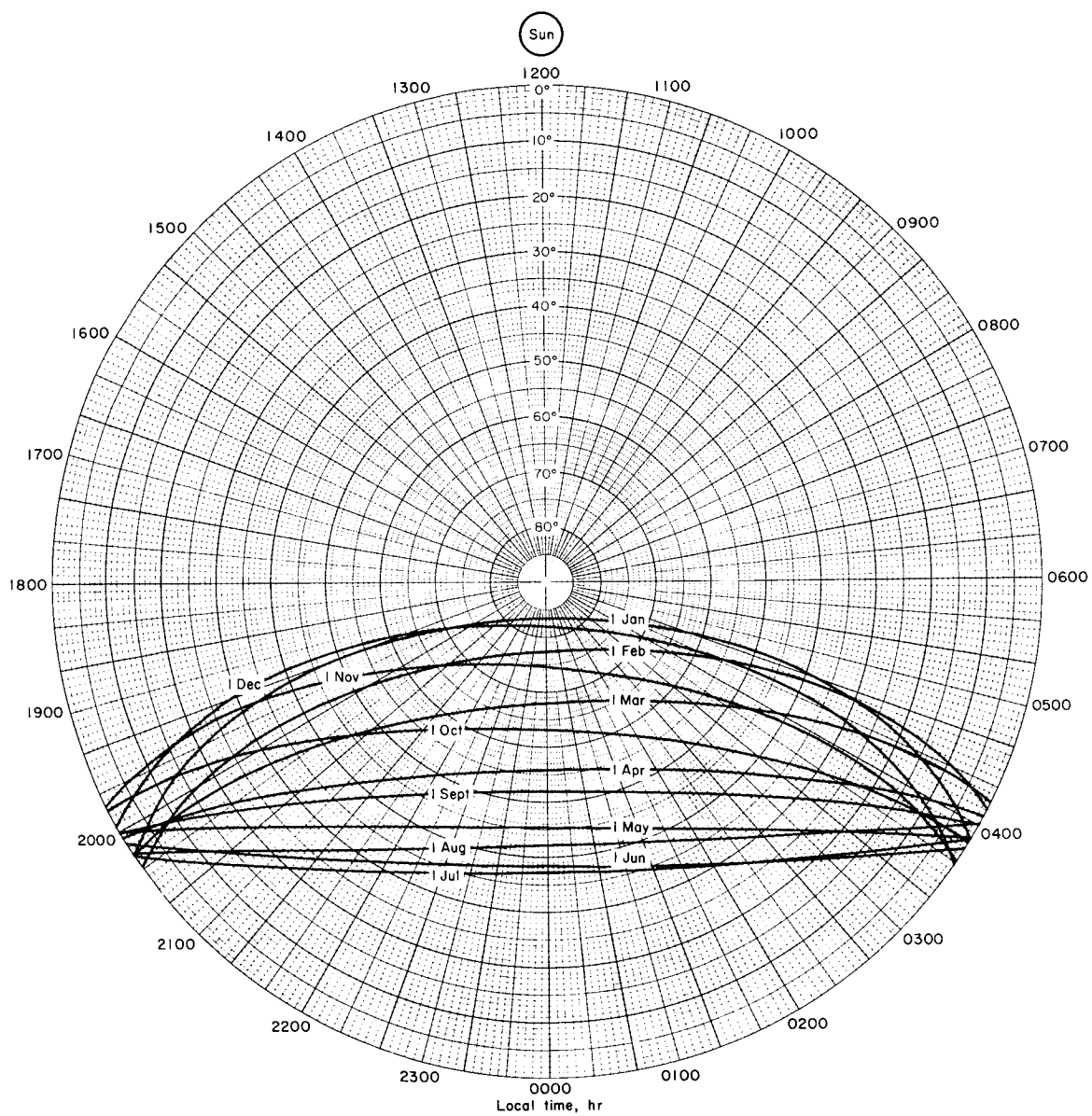


Figure 52.- Sunrise-sunset lines, height = 1000 km, north polar projection.

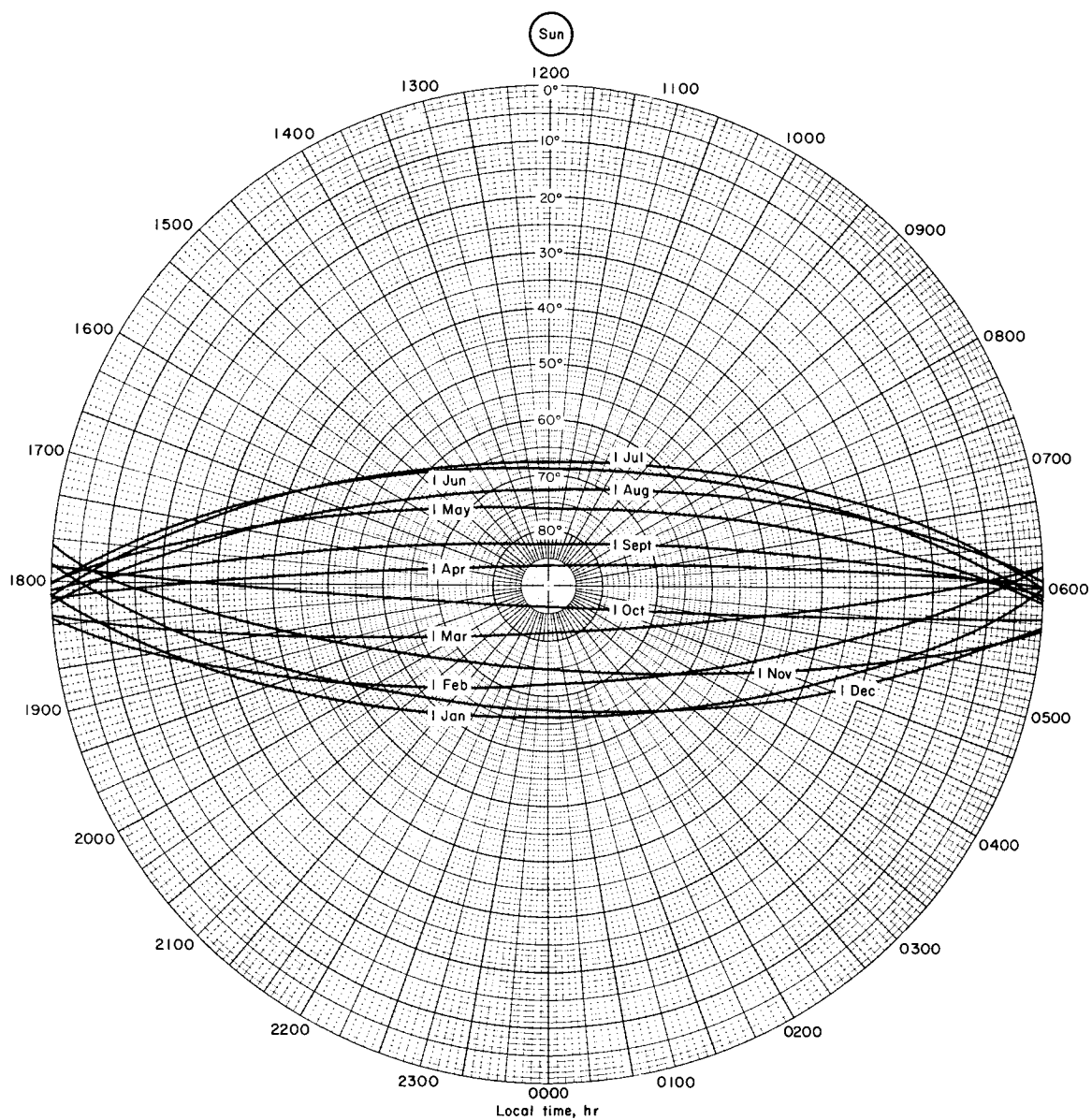


Figure 53.- Sunrise-sunset lines, height = 0 km, south polar projection.

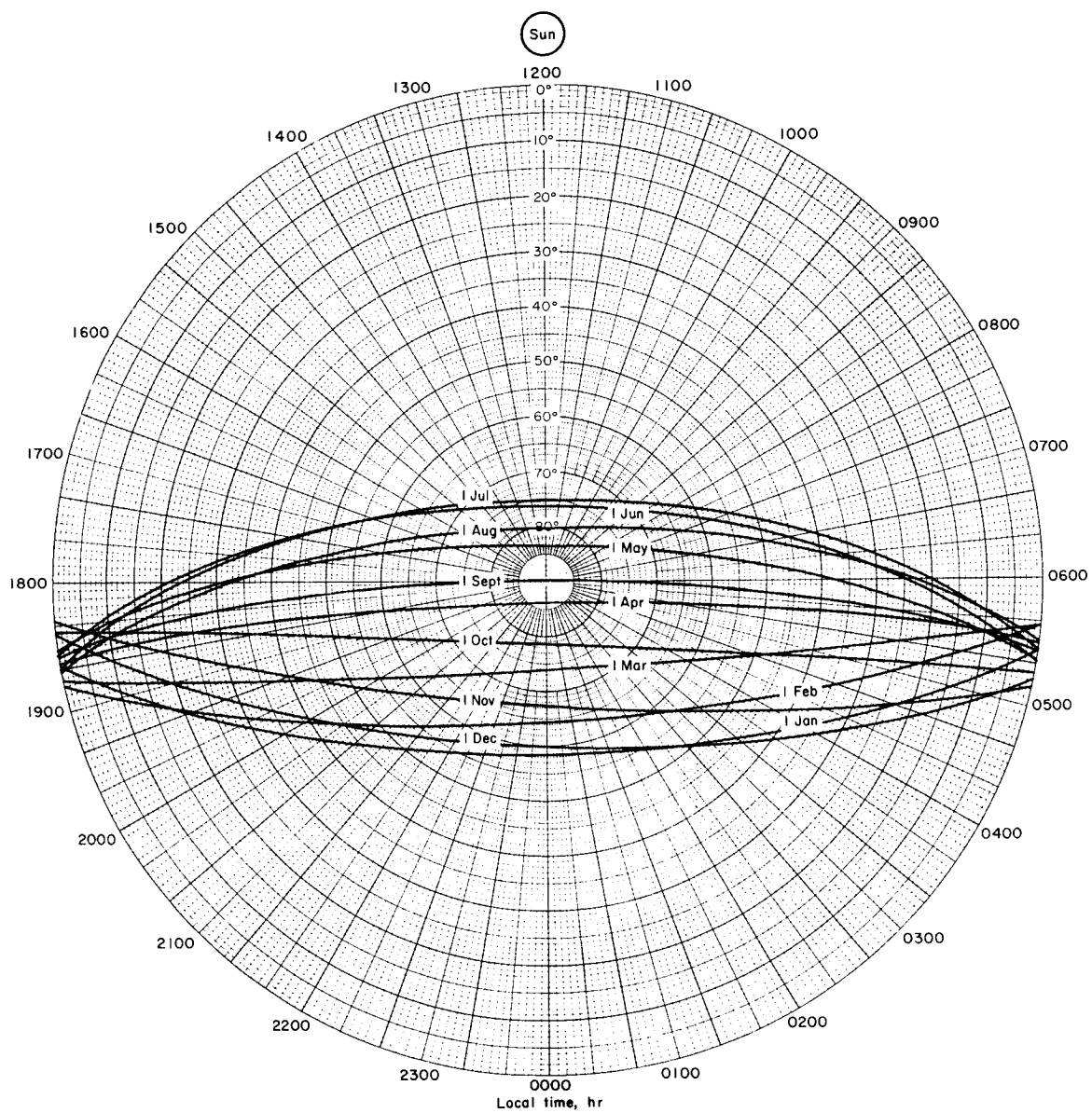


Figure 54.- Sunrise-sunset lines, height = 100 km, south polar region.

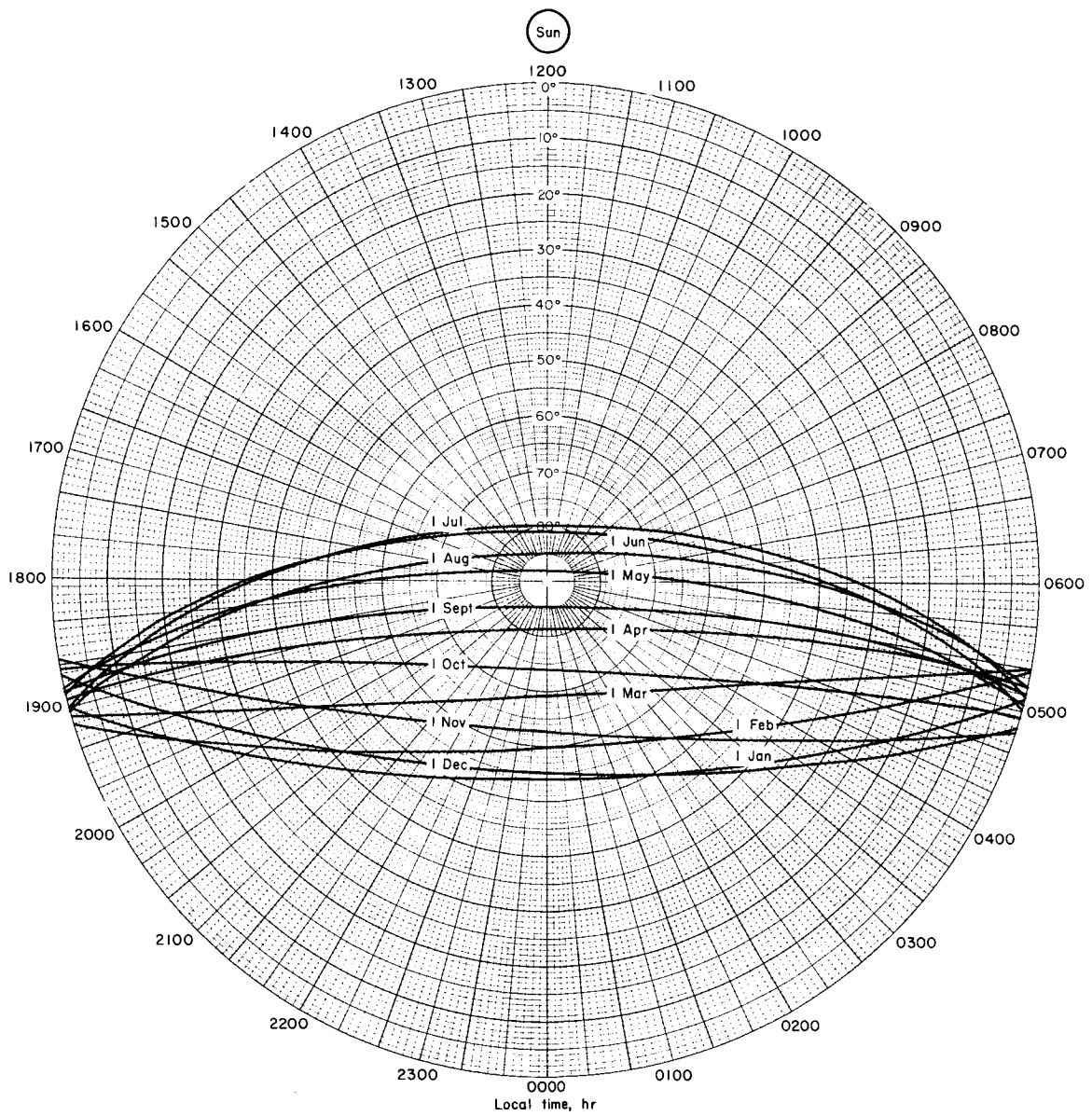


Figure 55.- Sunrise-sunset lines, height = 200 km, south polar region.

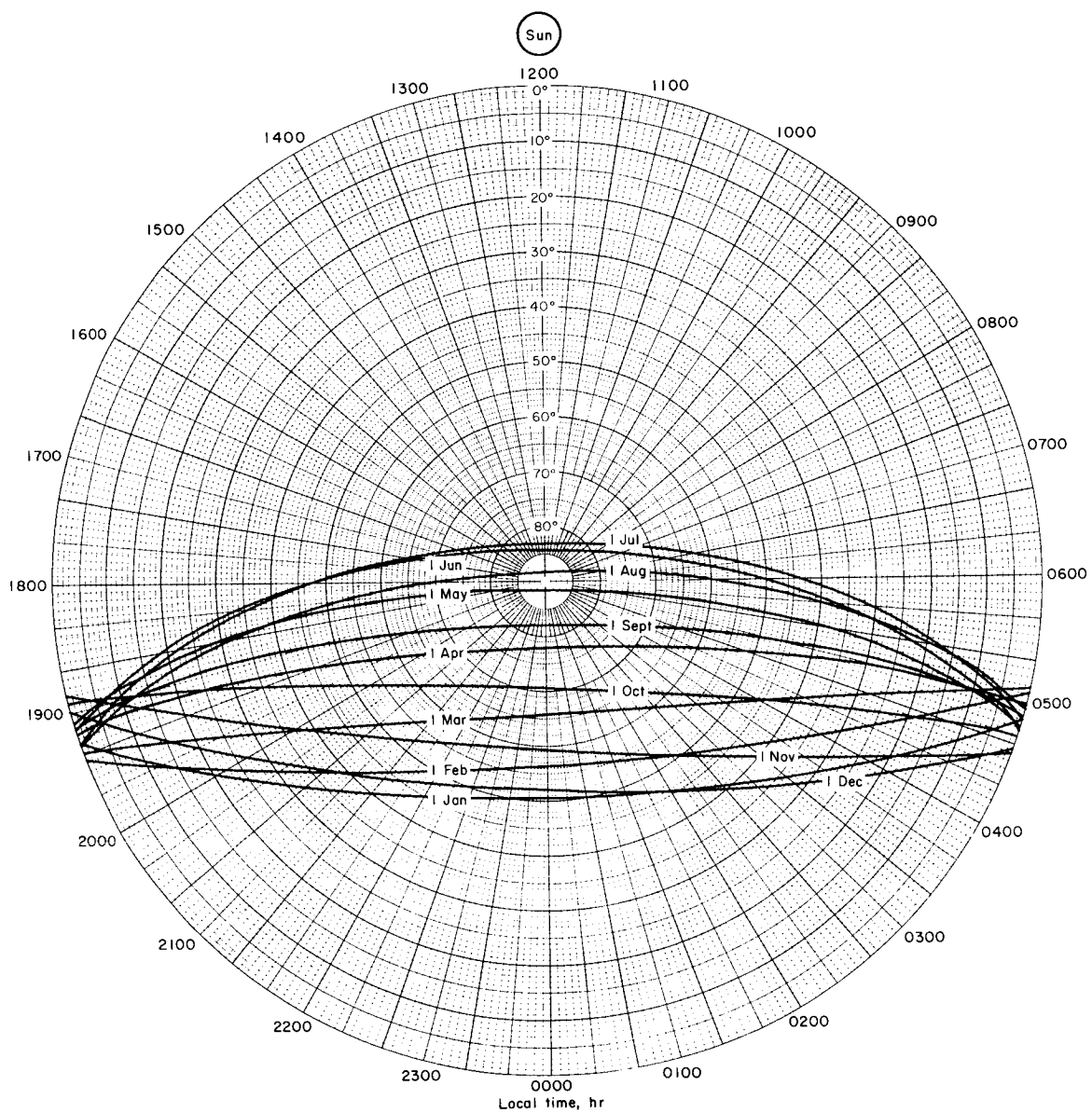


Figure 56.- Sunrise-sunset lines, height 300 km, south polar projection.

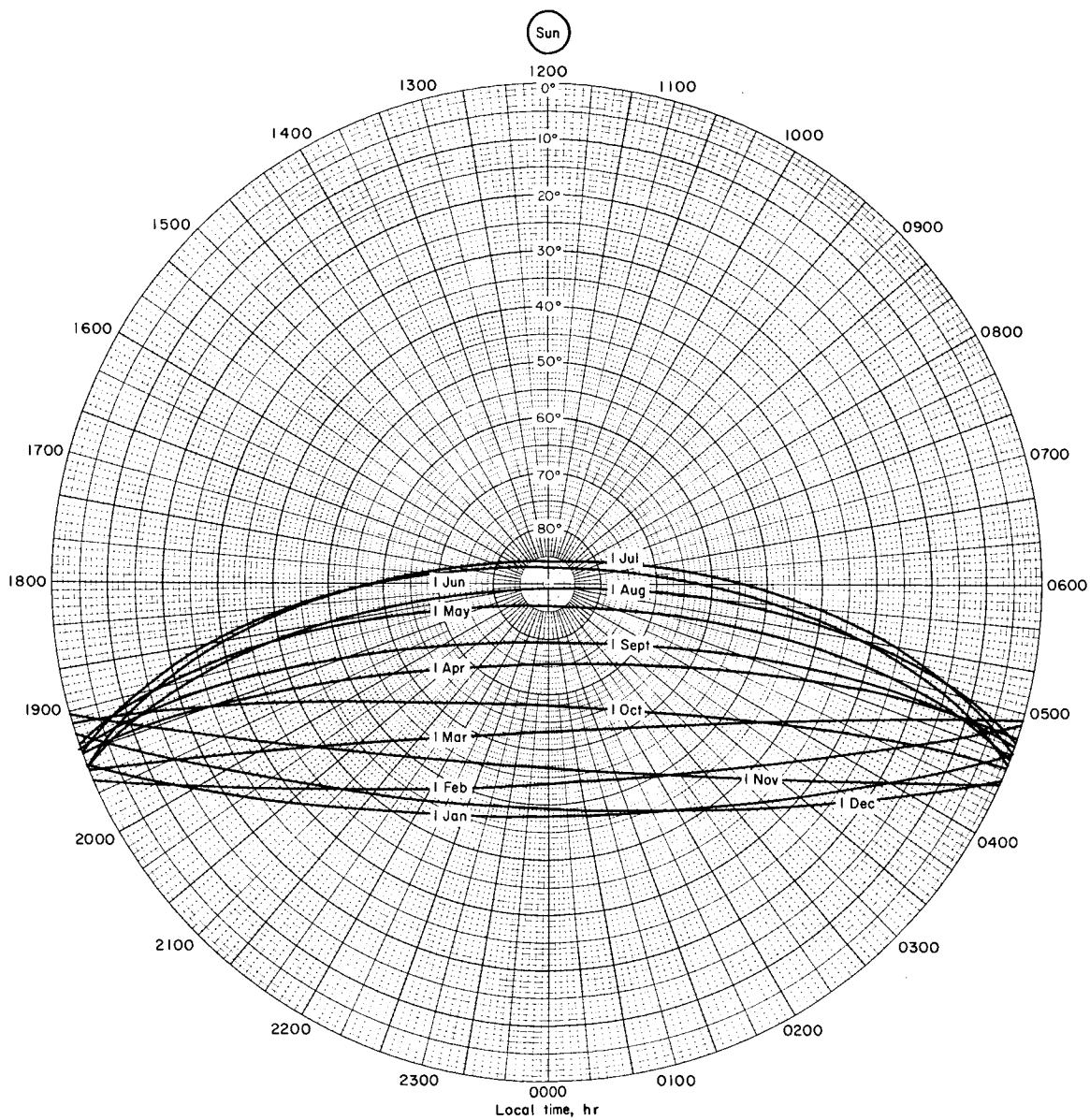


Figure 57.- Sunrise-sunset lines, height = 400 km, south polar region.

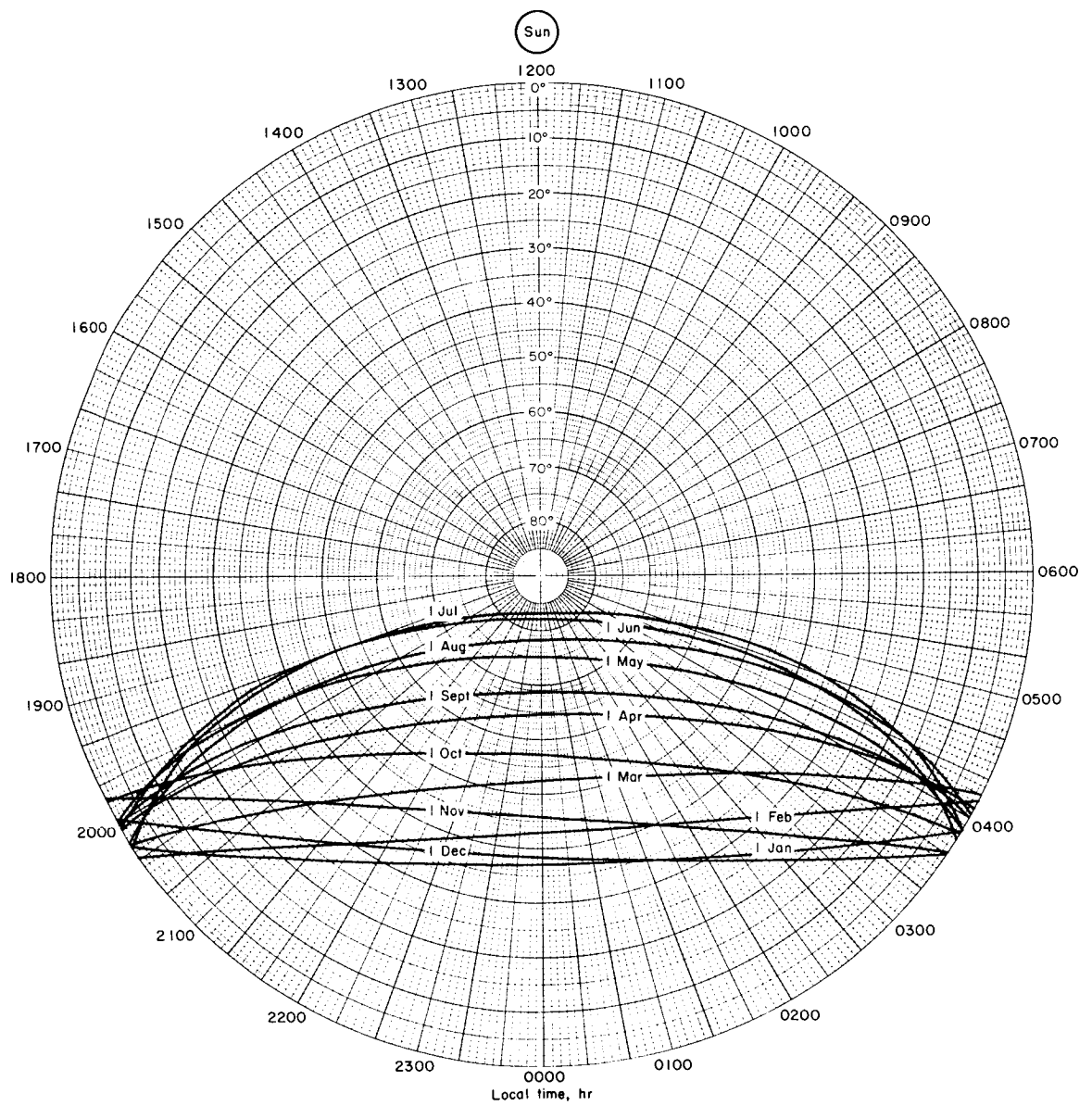


Figure 58.- Sunrise-sunset lines, height = 1000 km, south polar projection.

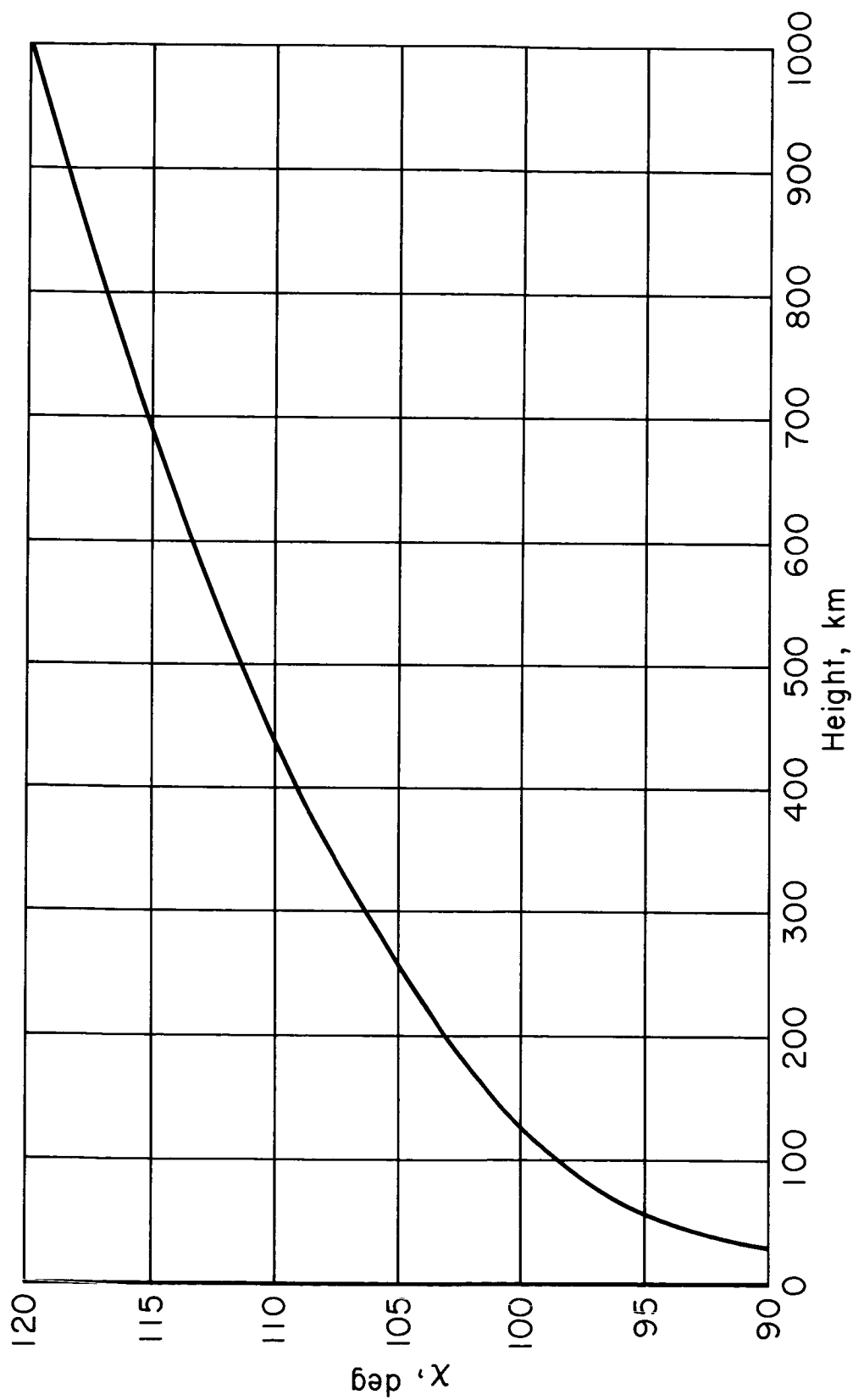


Figure 59.- Solar zenith angle at sunrise and sunset versus height for $S = 30$ km.